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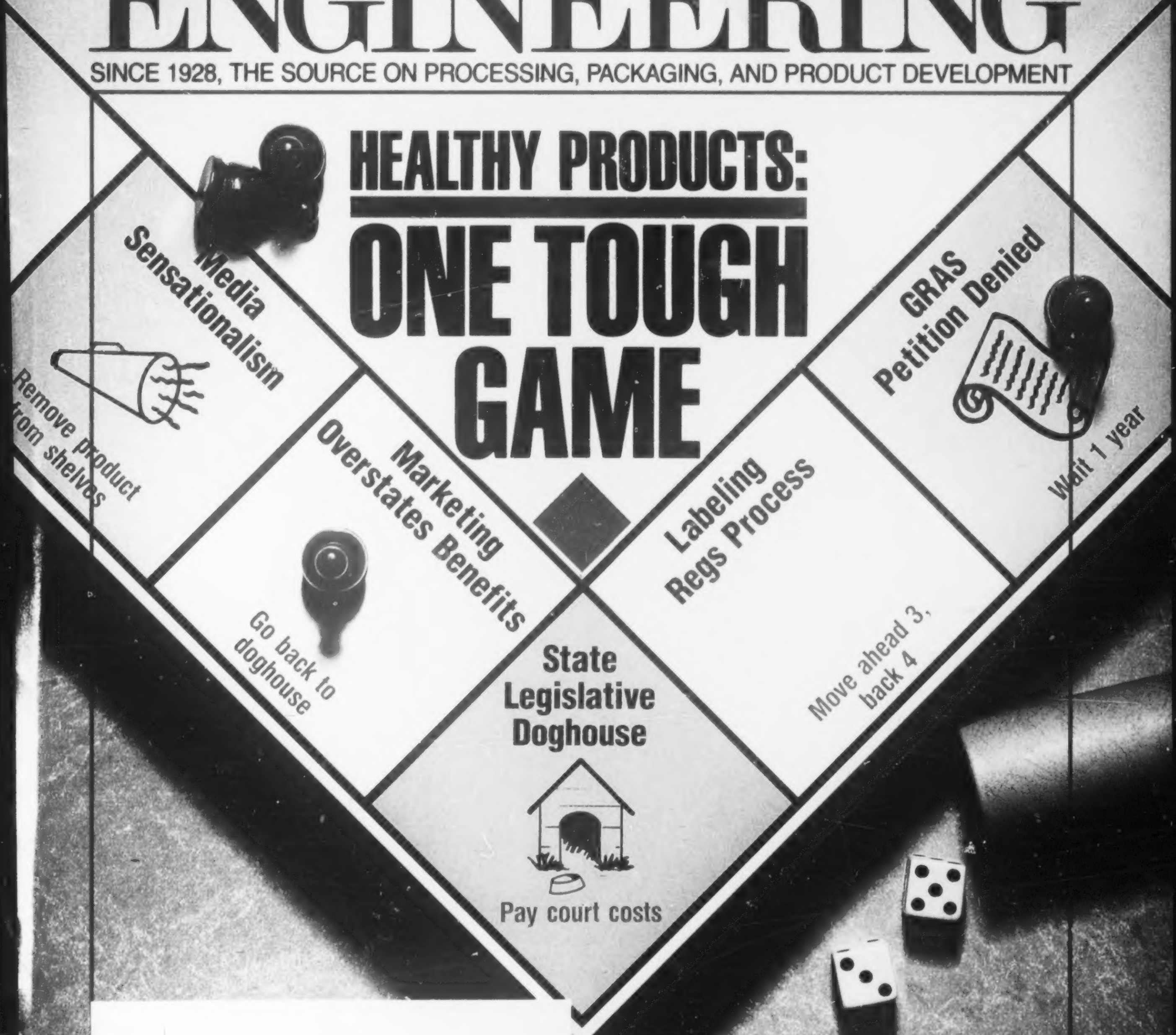
CHILTON'S NOVEMBER 1991

FOOD ENGINEERING

SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

HEALTHY PRODUCTS: ONE TOUGH GAME


Media Sensationalism
Remove product from shelves
Marketing Overstates Benefits
Go back to doghouse
State Legislative Doghouse
Pay court costs
Labeling Regs Process
Move ahead 3, back 4
GRAS Petition Denied
Wait 1 year

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FOOD ENGINEERING

HEALTHY PRODUCTS:
ONE TOUGH GAME
Marketing Overstates Benefits
Labeling Regs Process
State Legislative Beginnings
Pay court costs

ABOUT THE COVER

Trapped beneath by an avalanche of regulations, squeezed by proliferating labeling plans, skewered by the press and others, food producers are discovering the Healthy Foods business to be one tough game.

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JESSE H. NEAL
AWARD-WINNING
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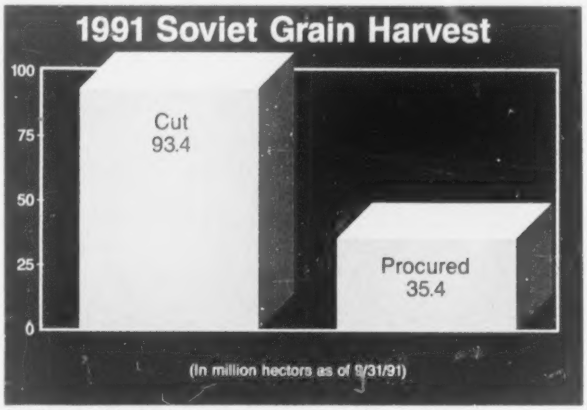
INDUSTRY REPORT

Gov't. fumbling spawns U.S.S.R. food shortages

Inefficiency created by a government-sponsored, centrally-controlled food distribution system is responsible for Soviet food shortage problems, said John Block, president of the National-American Wholesale Grocers' Association (NAWGA). In testimony before the House Agriculture Committee, Block said instituting a private wholesale food distribution system in the U.S.S.R. would improve food distribution.



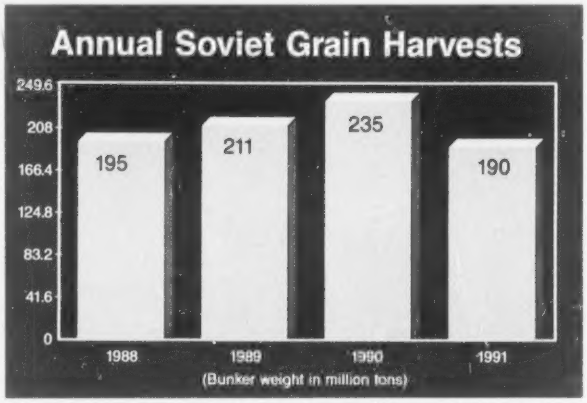
System-wide inefficiencies cause a large discrepency from harvest to procurement. (Source: USDA, ERS.)

"Because of the nature of communism and the near-worthlessness of the ruble, many products in the U.S.S.R. are bartered on the black market," Block said, rather than sold through legitimate channels. "Even if food enters the state-run system, there's often widespread loss of product because no one feels accountable for it—the products belong to no one in particular," Block said.

A wholesale distribution system that allows middlemen to buy from producers and sell to retail outlets ***would promote accountability*** *to the system and help stem the loss of food products, which in some cases can amount to 50 percent, between farm and store. Block added that the U.S. should provide short-term aid to the Soviets to ease food shortages during the winter months. Technical assistance should be provided to help the Soviets improve their production and distribution system, without "doling out dollars," he said.*

... but they won't starve, says USDA

Estimating how much food makes it from the fields to the grainhouses to the stores in the Soviet Union can be a tricky business, according to Ed Cook, USDA economist at the Soviet division of the Economic Research Service. Soviet accounting systems are loosely kept, Cook said, with government reports of harvests often lacking sources and footnotes.



This year's harvest in the Soviet republics was lower than previous years, but certainly not disasterous. (Source: USDA, ERS.)

As an example, in the U.S., grain is cleaned and biological waste (unedible parts such as stalks) are trashed before weighing the harvest, Cook said. However, in the U.S.S.R., waste and excess moisture are counted as part of the harvest (bunker weight)—padding the numbers by six to eight percent. Delays in harvest account for an additional 15 percent loss. And a certain amount slips through the official accounting system to wind up on the black market.

In the past, superlative harvests covered losses caused by processing and distribution inefficiencies. However, this year, the grain harvest was low, but not enough to cause starvation. The real problem is inflation caused by too much money in circulation and subsidies which make prices artificially low, Cook said. The Soviets subsidize consumer prices to the point that shelves are bare. "If bread in the U.S. was 39¢, all our shelves would be bare too," Cook said.

INDUSTRY REPORT

Technology to make Denmark global food processing leader

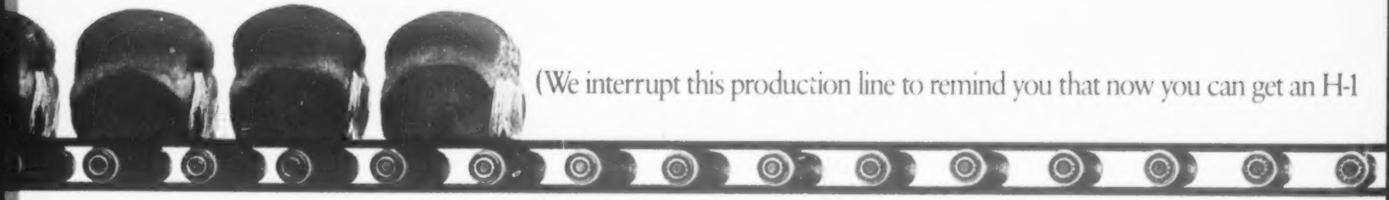
Denmark is a superb location for food processors operating in Europe because of its access to high-quality raw materials, sophisticated research and development capabilities, and a well-developed distribution system; in addition Denmark offers a consumer market with high educational and income standards. As a bonus, the port city of Rotterdam will be part of the ***shipment channel handling foreign trade with Eastern Europe,*** *the Baltic states, Russia and other Soviet republics, according to Erik Juul Jorgensen of the Institute for Food Studies & Agroindustrial Development, Denmark, in a report being prepared for the Danish Ministry of Foreign Affairs, New York City.*

Growth Forecast for Danish Food Companies
(In billions of 1990 U.S. dollars)

Industry	1990	2010
Meat	$5.6	$10.9
Poultry	0.2	0.9
Dairy	4.1	7.8
Fish	1.3	3.1
Beverages	1.1	1.6
Other foodstuffs (cereals, oils and fats, fruits, vegetables)	4.1	8.4
Total food production	16.4	32.7

Source: The Institute for Food Studies & Agroindustrial Development.

For U.S. companies looking to break into the European Community (EC), Denmark offers a high-tech production base. From 1990 to 2010, meat industry production is expected to double, poultry production to quadruple, dairy products to double, and fish products to double, according to Jorgensen.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New pectin fat replacer introduced

With word of new natural fat replacers coming fast and furious, Hercules has jumped into the fray with *Slendid*, a new fat mimetic made from pectin.

According to the company, Slendid is a proprietary specialty pectin derived from high-quality citrus peel, with sucrose added for gel strength. This pectin should not be confused with ordinary pectins used for thickening jellies. But Slendid, because it is a hydrocolloid, does exhibit the same thickening and gelling properties.

Hercules' technology is based on the fact that when fat is emulsified, it is sheared into small particles. Gels made with Slendid are also sheared into small particles during processing, with a size range similar to fat.

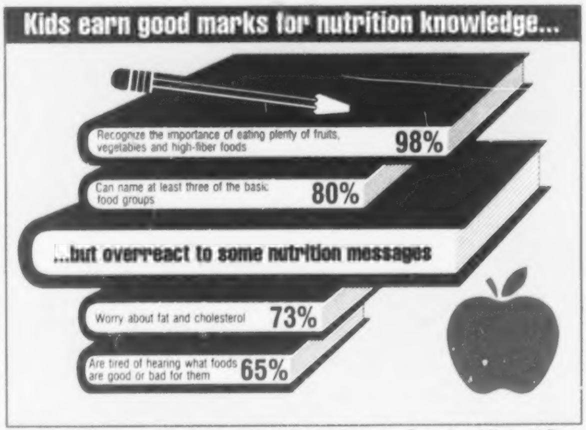
Slendid was developed to replace up to 100 percent of emulsified fats in products like salad dressings, soups, sauces and frozen desserts. Its heat stability allows it to be used in baking, microwaving and retorting applications as well.

Because of Slendid's bland taste, products do not require major flavor reformulation.

Hercules Incorporated, Hercules Plaza, Wilmington, DE 19894 **Circle 202**

MARKETPLACE

If only they practice what they preach



Source: Gallup Survey for the International Food Information Council and National Center for Nutrition and Dietetics, the American Dietetic Association.

The average school kid has a good grasp of the basic principles of nutrition, according to a new national Gallup survey. Ninety-eight percent recognize the importance of eating plenty of fruits, vegetables and high-fiber foods, such as whole-grain breads and cereals. However, like their adult counterparts, it remains to be seen whether children act on their nutritional knowledge by eating what they say is good for them.

"Obesity is the number one health problem in this country and it's getting worse," said Paul Lachance, Rutgers professor of food science. According to federal studies, childhood obesity has increased about 54 percent over the last twenty years. Health experts say that the answer to childhood obesity is exercise and healthy diets—not reducing diets. Although kids might know all the right answers, it is an entirely new step to get them to follow through on their knowledge.

"The level of knowledge demonstrated through this survey is a good sign that nutrition education efforts are reaching our nation's youth, despite some recent reports to the contrary," said Thomas E. Stenzel, International Food Information Council (IFIC) executive director.

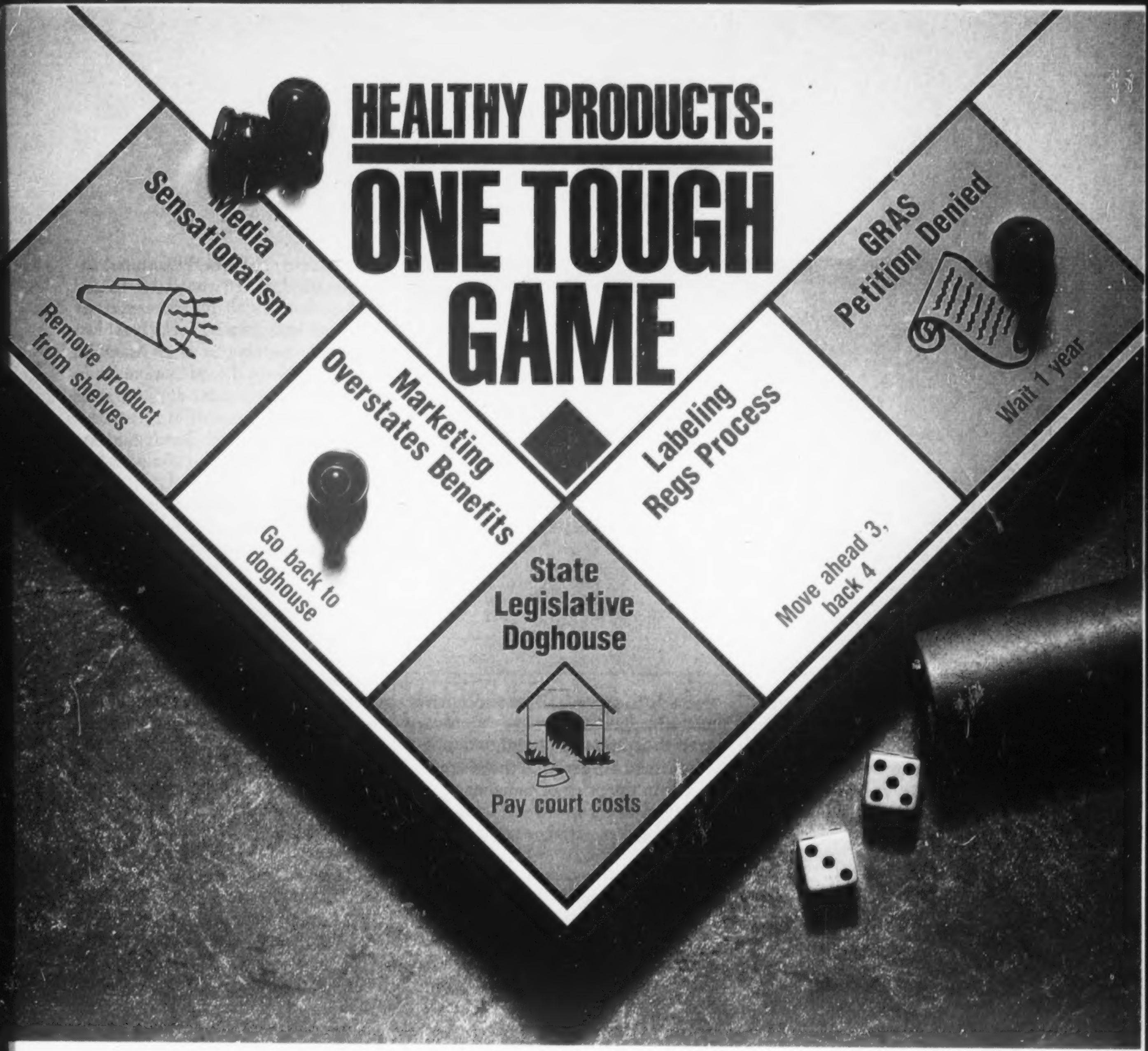
The July 1991 telephone survey of 407 fourth through eighth graders was sponsored by IFIC and the National Center for Nutrition and Dietetics, the public education initiative of the American Dietetic Association (ADA) and its foundation. The survey found that 95 percent of the children were familiar with the basic food groups and 80 percent of those could identify at least three of the four food groups.

"Children also showed a good grasp of the major nutrition principles—balance, variety and moderation," reported ADA President Mary Abbott Hess. Eighty-four percent agreed it's best to eat small amounts of many different foods and not too much of any one thing. Ninety-seven percent agreed that foods like ice cream, cookies and chips are okay to eat, but not all the time. Also, only 18 percent said they believe it's okay to "eat anything you want, whenever you want to."

"Clearly, these data provide evidence that children are one of the better nutrition-educated segments of society," Hess said. But, close to three quarters of the kids say they "worry" about fat and cholesterol—compared to only 56 percent of the adults polled in last year's survey.

Circle 18 or see FEM, p. IFC→

HEALTHY PRODUCTS: ONE TOUGH GAME


Media Sensationalism
Remove product from shelves
Marketing Overstates Benefits
Go back to doghouse
State Legislative Doghouse
Pay court costs
Labeling Regs Process
Move ahead 3, back 4
GRAS Petition Denied
Wait 1 year

The rules of the game favor development of healthier foods and food scientists are more than qualified to play. However, traps can send players back a few spaces or all the way back to start.

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

Like the game of *Monopoly*® the healthy foods marketing game is filled with tricks that can frustrate even the most experienced of players. While food engineers are capable of developing the healthy foods consumers want, food companies have to be ready to beat challenges that can stifle product development, such as media sensationalism, overblown marketing claims, regulatory hurdles and the public's science phobia.

Press misinformation can plague a perfectly acceptable product such as McDonald's *McLean Deluxe*, a burger which boasts nine percent fat compared to the average burger's 20 percent fat. Based on research carried out by Dale Huffman and associates at Auburn University, AL, McDonald's low-fat burger contains 90 percent lean beef, nine percent water and one percent encapsulated salt, carrageenan (a derivative from sea weed) and natural beef flavor.

While the press referred to this breakthrough as a "seaweed burger," a sharp Washington Post reporter decided to follow up on the story and discovered that all fast food chains use carrageenan in their milk shakes—thus alleviating the reporters' (and hopefully readers') apprehension of this "new" ingredient.

When asked by *FE* how it combats negative press, a McDonald's spokesperson said the chain is only concerned about informing its customers

[illegible]

Food	Phytochemical	Benefit
Garlic	Sulfur compounds	Retards tumors, reduces cholesterol.
Licorice root	Triterpenoids	Stifles rapid cell division, promotes normal cell growth.
Flaxseed	Lignans	Blocks cancer-causing prostraglandins.
Soybeans	Isoflavins	Inhibits enzymes that change normal cells to cancer cells.
Parsley	Polyacetylenes	Blocks prostraglandins.
Citrus fruits	Flavonoids	Regulates cell division.

Source: National Cancer Institute.

Future healthy foods may result from studies the NCI is conducting on known cancer-preventive foods, such as these. The best candidates will be studied in various combinations to increase their efficacy.

through in-store leaflets and ignores outside flak. However, industry sources say that vunerability to being a "seaweed burger" and the recent increase in the price of carageenan, has spurred McDonald's to consider switching from carageenan to a starch replacer.

A shot in the foot

Sometimes a company doesn't need outside help to shoot itself in the foot. Generally, the marketing department pushes R&D to develop formulations that fit marketing's advertising claims. However, as in the case of high-fiber cereals, companies have gotten into trouble with both state attorney generals and the FDA.

How can food companies avoid shooting themselves in the foot with sweeping health claims? First, remember the age of the mass market is dead, said Lauren Swann, president of Concept Nutrition, Inc., a Bensalem, PA firm specializing in marketing communications and regulatory affairs. While speaking at the Healthy Foods Marketing and Positioning Conference sponsored by IBC USA Conferences in Washington, DC in late October, Swann recommended that food companies divide their market into segments. For example, she said, not everyone is liable to develop heart disease, so don't market all high-fiber cereal strictly to heart attack candidates. Swann also urged food companies to be more socially responsible to gain back the trust lost by misleading claims. As an example, Swann challenged food companies to advertise with normal serving sizes and to avoid jumping on nutrient bandwagons by overadvertising one nutrient at the expense of a well-balanced diet.

While marketing drives R&D, better communication between the departments can nip potential problems. For instance, an executive at one large firm that formed as a result of a megamerger, said the corporation was still struggling with two conflicting mindsets. One company clings to its pre-merger mentality that unofficially decrees that R&D and marketing are to avoid contact with one another. The other company, which has had greater success with new products, is struggling to transplant an updated concept which encourages more interaction between R&D and marketing. Teams from marketing and R&D (and other departments) meet at least once every two weeks. "You'd be surprised how divergent we get if we miss our meetings," the exec added.

Regulatory worms

Some low-fat formulations have opened a can of regulatory worms because they clash with FDA standards of identity. As an example, Simplesse's *Simple Pleasures* non-fat frozen dessert can not legally be called a non-fat ice cream because by its very definition, ice cream means it contains fat. Ironically, laws originally designed to protect the public from fraudulent products are hamstringing the efforts of food companies trying to formulate healthier foods. The improved foods can be formulated but must be marketed under less attractive names. "If a healthier, lower-fat product is available—and there are countless examples—food manufacturers should be able to market the product under a familiar, standard name," said said Ellen Haas, executive director of the Washington, DC-based special interest group, Public Voice for Food & Health Policy. She outlined current choices industry has, which include, first, using unfamiliar names. Second, going through a lengthy, expensive regulatory process to amend the standard or establish a new one. Third, not marketing the product at all. These, Hass acknowledged, "are not choices at all."

Although science can make a non-fat ice cream, the FDA debates use of the term. "Some within the agency argue, saying fat-free ice cream is an oxymoron," said Lynn Larsen, FDA spokesperson. "However, industry maintains that consumers understand the difference," he added.

In a similar quandry, Land O'Lakes was allowed under Minnesota law to market its *Light Butter* (containing less than 80 percent milkfat). However, the FDA objected and discussions are expected to continue for a few more months, said Terry Nagle, Land O'Lakes Inc. spokesperson. In the meantime, the company is distributing Light Butter in Minnesota and has been granted temporary marketing permits (of undefined duration) in New York and Wisconsin, he added.

FDA's proposals (due November 8) under the new nutrition law is expected by both Land O'Lakes and the butter trade groups to cover light butter. However, it is unclear whether state laws will be preempted by the law. Marketers of low-fat and healthy foods contacted by *FE* await FDA rulings that will finalize exact definitions of label descriptors, such as *light*, *low-fat* and *non-fat*, (among other issues).

Recent actions from the FDA may be interpreted as being more liberal toward non-fat labeling. In late August, the agency granted two more temporary permits to test market non-fat cottage cheese to Marigold Foods,

HEALTHY CHOICE
EXTRA LEAN
HEALTHY CHOICE
EXTRA LEAN

Low-fat ground beef has gone beyond food service to reach the retail level. (Source: ConAgra, Inc.)

Food as drug legislation sought

Foods sold for disease prevention—such as extract of garlic which research has shown prevents cancer (see main copy)—walk a thin line between being food and drug. As a result, state attorney generals, followed by the FDA, have swooped down on foods that insinuate they can cure illnesses. Remember the flap over Kellogg's *Healthwise* and General Mills' *Benefit* cereals that cited hospital studies backing their products as aids in fighting heart disease. State attorney generals balked, saying foods that claim to help prevent disease are essentially drugs.

However in their zest to curb exaggerated claims, the G-Men are crippling U.S. food industry competitiveness. While U.S. food regulatory agencies struggle with food versus drug definitions, European and Japanese companies are marketing foods that have health benefits. Japan is already forging ahead in the world race to patent plant-derived products while the European Community is considering regulatory procedures for foods with health benefits.

Meanwhile, in laboratories worldwide, research is examining the use of food ingredients to prevent and treat diseases. The National Cancer Institute (NCI) has embarked on an ambitious program to examine the role of foods in cancer prevention. In the past, funding has been largely for chemopreventive drugs.

However, the research findings will fall short of the mark if present laws fail to change. Presently, there is no system to approve of, or grant marketing rights for, foods with health benefits, according to William Curran of Harvard Medical School and a member of the Nutraceutical Advisory Group. Companies have no incentive to invest in further research and, as a result, the public will continue to be at the mercy of media reports of suggestive but inconclusive clinical studies, he added.

The Foundation for Innovation in Medicine, Cranford, NJ, headed by Dr. Stephen DeFelice, drafted proposed regulatory reforms which would create a commission to review foods with health claims.

While J.B. Cordaro, president of Council for Responsible Nutrition, agreed that foods with health benefits should be able to be marketed, he said creating a new regulatory agency is unrealistic because Congress and present regulators would resist giving up their authority. The best approach for food companies is to be ready to comment on FDA's new proposals due early this month in accordance with the Nutrition and Education Act of 1990, Cordaro said. His group has already submitted proposals on labeling and claims.

Comparison of 1959 and 1983 height and weight tables

Height	1959 range	1983 range	Change (in lower/higher limits)
Men (Medium frame, weight in pounds)			
5' 2"	114-126	128-138	14/12
5' 7"	131-145	140-152	9/7
6' 0"	151-168	155-169	4/1
6' 3"	165-183	166-182	1/−1
Women (Medium frame, weight in pounds)			
5' 2"	109-122	118-132	9/10
5' 5"	120-135	127-141	7/6
5' 8"	132-147	136-150	4/3

Source: Metropolitan Life Insurance Co.

Weight reduction attributes to the popularity of low-fat foods. While no studies prove that Americans are gaining weight over time, many health experts point to Metropolitan Life Insurance charts as proof.

Inc. and Oak Farms Dairy. Last year, the agency approved of a temporary permit to Kroger Co. to market a non-fat cottage cheese. The permit was ammended from a 0.1 percent to less than 0.4 percent milkfat or less than 0.5 grams per serving. Both of the two new temporary permits (a duration of 15 months) stipulate less than 0.5 percent milkfat and less than .5 gram fat per serving.

USDA also loosened its collar with a late August ruling that allows greater use of non-meat proteins to emulsified meat products such as hot dogs and sausages. "High quality vegetable proteins, such as isolated soy proteins, have an additional advantage over other non-meat proteins, like egg and milk proteins, because they match the taste and texture of meat proteins in the final product," said Daniel L. Camerer, director of meat industry markets, Protein Technologies, Int'l.

Low-fat effects

As low- and non-fat products gain wider acceptance, there has been some criticism about the possible health effects of fat replacers. While most Americans consume overly high amounts of fat, some objections to low-fat foods have been that consumers would risk vitamin deficiencies from not being able to get enough fat-based vitamins, such as Vitamin A and E. This possibility was dismissed by Robert Kuczmarski, a health statistician trained in public health nutrition with the National Center for Health Statistics, Washington, DC. "This would only occur if people ate non-fat foods exclusively without balancing them with other foods," he said, adding that such a scenario was unlikely.

The possibility that obesity may have peaked in the 1990s was raised by Kuczmarski. He compared the national campaign against fat to the campaign against heart disease which was a great success since heart disease is now in decline once consumers reacted positively to the national campaign emphasizing diet, exercise and not smoking.

Fear of science

Will the public's irrational fear of things scientific hamper the marketability of healthy foods formulated through biotechnology? One discouraging development is that Monsanto's bovine somatotropin (BST) cleared regulatory hurdles, only to be snagged by special interest groups.

Currently, the BST controversy may stall companies from making the necessary time and financial commitment to develop new bioengineered products. In addition, Decision Resources says there is a real need for vigorous biotech public relations.

Calgene, a company which pioneered a bioengineered tomato that stays fresh longer, is preparing a campaign to win consumer approval. The first step is to get FDA approval which will convince consumers biotech products are safe, said Daniel Wagster, Calgene spokesperson. Secondly, the company plans to launch an education program to reach special interest groups. Calgene's educational efforts might very well be a model for other food companies. Better educated consumers make the best customers—which would alleviate some of the regulatory constrictions, misperceptions and politics that have, up until this point, made marketing healthy foods a game of jeopardy. ▲

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CHILTON'S DECEMBER 1991

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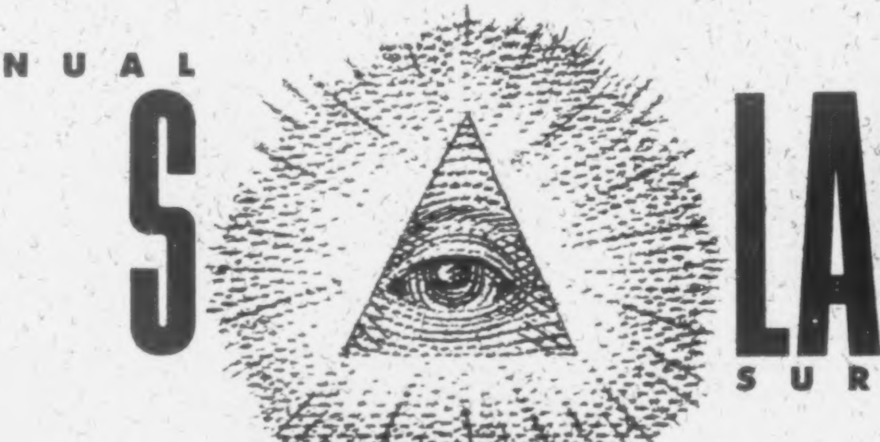
S  LARY

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FOOD ENGINEERING

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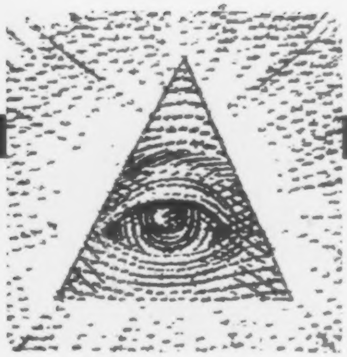

ABOUT THE COVER

Salary freezes and employee layoffs, long held at bay, are now cropping up throughout the food industry, reports *FE*'s annual survey of salaries and job satisfaction.

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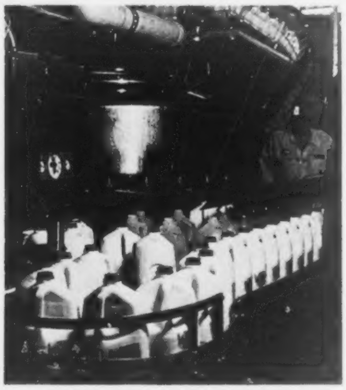

SPECIAL EMPHASIS

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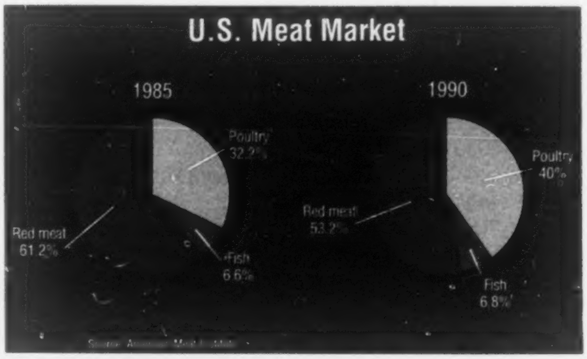
INDUSTRY REPORT

AMI includes Canada & turkey processors

The American Meat Institute (AMI), looking beyond red meat and national boundaries, has expanded its membership to include poultry and Canadian packers and processors. Also, a larger role was announced for AMI members who supply equipment, ingredients and services to industry members. Supplier members will also be represented on the AMI Board of Directors.



Poultry is taking a bigger bite out of the meat market.

Meanwhile, the European Community's (EC) move to relist ten additional U.S. meat plants as eligible to export to the EC was viewed by the U.S. meat trade as a positive step toward reducing trade barriers. The EC had objected to U.S. meat imports on the basis that the U.S. meat industry practice of using hormones was dangerous to human health. The U.S. has maintained the EC move is purely protectionist.

And, now, a panel of ***leading European scientists reaffirmed the safety of U.S. meat.*** *The European Alliance for Safe Meat released a report entitled,* Hormones in Meat Production, *which confirms that the proper use of hormones in livestock is safe and more effective in ensuring consumer safety than the present ban.*

IMAGINE THE POSSIBILITIES . . .

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Food Plants '91 features 'world class' technologies, strategies

More than 325 people from food-processing and engineering firms convened in Dallas, Oct. 2-4, for Food Plants '91, the sixth annual plant-design and manufacturing conference conducted by Food Plant Strategies and co-sponsored for the second year by *Food Engineering*.

Cost Trends, Average vs. Best Plants (1987 to 1990)

	Average	Best
Total costs	1.4% ▲	9% ▼
Material costs	1.6 ▲	5 ▼
Value-added costs	0 ▲	10 ▼

Source: A.T. Kearney, Inc.

One repeat attendee described the conference as "the annual meeting of the food plant engineering business," noted William H. LeMaire of Food Plant Strategies. Conference highlights included microwave sterilization at P&T Foods (Belgium), open CIM at Unilever, and time-compression strategies at Campbell Soup and Kraft General Foods. Other highlights follow.

For conference proceedings, contact: Food Plant Strategies, Inc., 122 S. Church St., West Chester, PA 19382.

Are you 'world class'?

At Food Plants '91, the cliche "world class" was put into perspective by William H. Windle, vice-president of A.T. Kearney, in Kearney's 1990 "benchmark study" of more than 100 food plants operated by 40 companies in North America and Europe. The study included firms such as Kraft General Foods, Campbell Soup, Coca-Cola, Heinz, Kellogg, and Sara Lee. Following the first benchmark study in 1987, the 1990 study assessed each company against the original study in 14 areas such as quality, customer service, costs, technology and flexibility.

Unlike the earlier study, said Windle, some clear leaders were discernible in 1990. In the area of quality, the best performers are eliminating the traditional quality-control function, making operators more responsible for in-process quality, and applying TQM (Total Quality Management) programs for continuous improvement.

The best companies are also flattening plant organization by three or four levels; widening supervisory control to ratios like 25:1; boosting the ratio of hourly to salaried people by 6 or 7:1; and establishing self-directed, team-oriented work forces.

Average utilization of plant capacity is 50 percent, but the best plants have reached 75 percent and are driving higher. While it takes the average plant 48 minutes to make a product changeover on-line, the best plants are doing it in 10. On average, process control is automated on 40 percent of production lines; in the best plants, 90 percent of the lines are automated. The best companies are applying DCS (distributed control systems) to integrate process, quality and production controls. Through vendor partnerships and improved flexibility, the best plants have reduced raw-material inventories to five days vs. the average 14, and finished-goods inventories to five days vs. the average 30.

Capital replaces more labor in the best plants, where capital expense is 13 percent of total

Highlights: Food Plants '91; world class; sous vide; chilled foods.

manufacturing cost as compared to 7 percent in the average plant. The labor cost of maintenance is only 5 percent of hourly payroll in the best plants versus 10 percent in the average plant.

European food plants are similar in performance to North American plants, said Windle. While European process technology is slightly more modern, North Americans are better at managing people.

A.T. Kearney, Inc., 222 S. Riverside Plaza, Chicago, IL 60606
Circle 301 ▲

New *sous vide* plant

At Food Plants '91, Idle Wild Farm reported creation of a new division tentatively called Quality Cuisine, Inc. (QCI) to produce extended shelf-life foods via *sous vide* and/or clean-room conditions as a contract packer, said Technical Services Director H. Louis Cooperhouse. QCI operates an $8.5 million, 55,000 sq. ft. plant built at Pomfret Center, CT four years ago by General Foods to produce its now-discontinued *Culinova* line of chilled entrees. More recently it was used by Kraft General Foods to produce its *Chillery* and *Fresh Creations* lines.

First client: Idle Wild Farm, for 2 million lbs. of *sous vide* meat and poultry products showing 15-30 percent gains in yield and significant quality improvements, said Cooperhouse.

QCI offers equity interest to food companies or financial institutions who share QCI's confidence in the business, and marketing partnerships with firms interested in establishing a proprietary position.

Idle Wild Farm, 153 Searles Rd., Pomfret, CT 06259 **Circle 302**

Benefits of *Sous Vide* vs. Conventional Cooking

Improved	Reduced
Taste	Shrink
Texture	Waste
Moisture retention	Labor
Flavor retention	Space
Nutrition levels	Salt
Consistency	Preservatives
Yields	
Flexibility	

Source: H. Louis Cooperman, Idle Wild Farm.

Promise, pitfalls of chilled foods

The "living laboratory" of the past decade provided a learning curve for the development of chilled foods, said H. Louis Cooperhouse, director of technical services at Idle Wild Farm and former vice-president of technical operations at Culinary Brands. (*Editor's note:* Culinary Brands, a *sous vide* packer in Stockton, CA, shut down last spring when Nestlé—a major investor—withdrew its support in favor of bolstering its Stouffer's frozen-food business.)

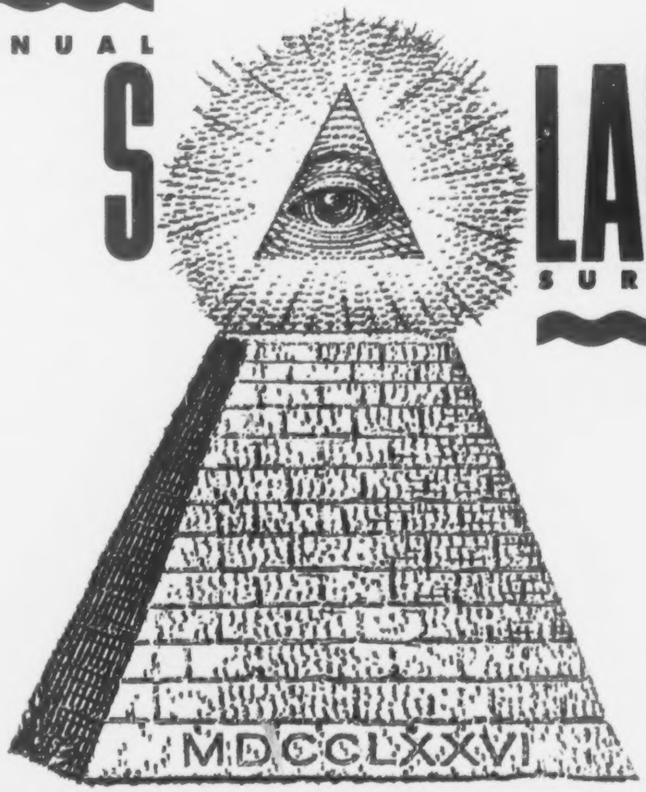
Key to the learning curve: understanding the technologies involved. "Every change to product formulation and process has been shown to significantly impact resultant quality, shelf life and safety," Cooperhouse continued.

Of the three basic chilled-foods technologies—modified-atmosphere packaging (MAP), cook/fill/chill and *sous vide*—"in my opinion *sous vide* offers the highest quality, safety and extended shelf life," said Cooperhouse. It is, however, the most complicated and requires the longest learning curve. He nevertheless predicted that "*sous vide* will be the predominant technology for processing of chilled foods sold at retail in the year 2000."

Other key lessons on the learning curve:

- A chilled-foods project does not follow classical marketing strategy. "You must allow the market to be *technologically* driven," he added.
- Maintain "super-chill" temperatures (30-34°F) throughout the cold chain, from manufacturing plant to consumer refrigerator (*FE* May, July '91.) This boosts product shelf life two to four times.
- Use TTMs (time/temperature monitors), which recognize actual product abuse. "Use-by" codes are meaningless.
- Change merchandising tactics. Retailer insistence on full display cases, and processor concerns about being out of stock, lead to surplus inventory that typically is not rotated and lies in the case for a third of its shelf life. Best store location is the meat or deli department, not end-aisle kiosks.
- Boost the image of freshness. Cooperhouse believes that MAP is negatively perceived by consumers: Products are typically overpackaged, and the perception of "air" in the package does not convey "freshness." Vacuum-packaged products, however, *are* perceived as "fresh," so "*sous vide* products, packaged in trays with peelable lids, will be much better received."
- Build safety into product and process by applying HACCP principles and microbiological barriers.

ANNUAL SALARY SURVEY



RIDING OUT THE RECESSION

While slow in arriving, the recession is now impacting the food industry, resulting in smaller raises and increased layoffs.

ROBERT E. HARVEY
MANAGING EDITOR

The symptoms are painfully obvious: the food industry, overexposed to an ailing economy, is, at last, showing signs of illness.

Last year, while a recession-spawned miasma was choking growth elsewhere, food industry employees were enjoying, on average, a healthy seven percent increase in salary.

However, this year average increases were an anemic 2.7 percent, according to *Food Engineering's* annual survey of salary issues and job satisfaction among food industry professionals.

While raises are down, the percent of employees receiving compensation over and above their base salary rose slightly in 1991 compared to a year ago. About 46.9 percent of those surveyed received added compensation this year vs. 46.0 percent in 1990. Interestingly, out of that 46.9 percent, 20.8 percent (only 19.4 percent in 1990) received compensation that was more than 10 percent above and beyond their salary.

Efforts to cope with the prolonged recession have meant fewer pay raises (but additional compensation) and increasingly lean operations. As a result,

Salary by Job Title (in thousands of dollars)

	Under 25	25-29.9	30-34.9	35-39.9	40-44.9	45-49.9	50-54.9	55-59.9	60-69.9	70 or more
President	9.0%	4.5%	—	1.5%	4.5%	1.5%	3.0%	11.9%	4.5%	58.2%
V.P./manufacturing	4.5	—	2.3	4.5	2.3	—	9.1	2.3	15.9	59.6
V.P./marketing	5.9	5.9	11.8	11.8	—	5.9	4.8	—	17.6	29.4
Plant manager	1.1	3.3	6.6	14.3	12.1	12.1	12.1	9.9	17.6	16.5
Production supervisor	4.8	4.8	16.1	19.4	12.9	9.7	8.1	6.5	9.5	9.7
Engineering manager	—	2.6	5.3	3.9	5.3	14.5	17.1	14.5	17.1	19.7
Project engineer	0.8	1.5	5.3	12.2	16.8	14.5	16.0	9.2	16.0	7.6
Packaging manager	—	—	16.0	16.0	8.0	12.0	12.0	8.0	8.0	20.0
Purchasing manager	2.3	6.8	13.6	20.5	6.8	15.9	6.8	4.5	13.6	9.1
Technical director	1.4	2.8	5.6	8.4	2.8	12.7	9.9	8.4	9.9	38.0
QC manager	4.8	10.4	15.2	19.2	18.4	5.6	8.0	4.0	8.0	6.4
Food technologist	8.5	12.4	17.8	14.7	10.1	8.5	13.2	3.1	7.0	4.7
Marketing/product/ sales manager	—	7.4	5.9	11.8	14.7	11.8	10.3	4.4	17.6	16.2
Sanitation/ maintenance manager	5.9	7.8	7.8	15.7	17.6	17.6	9.8	5.9	3.9	7.8
Transportation/ distribution manager	5.0	5.0	15.0	15.0	20.0	10.0	5.0	10.0	5.0	10.0
Purchasing agent	—	20.0	10.0	20.0	20.0	30.0	—	—	—	—

Percentages may not add up to 100 due to incomplete or duplicate answers.

Source: Food Engineering 1991 Salary Survey.

Median Salary by Sex

		% increase over 1990
Male	$51,778	2.81
Female	37,364	2.35

Source: Food Engineering 1991 Salary Survey.

managers find themselves responsible for more people: on average 35 people in 1991 compared to 33 people in 1990 details the survey.

At the same time, some 38 percent of those polled this year report personnel cuts in their department, compared to 35 percent in 1990.

Stripped-down food and beverage processing operations, while welcomed by some, are not everyone's cup of tea. "New 'flatter' organizations have removed the traditional ladder of success," complains one survey respondent. "Personal satisfaction must be found outside work since advancement opportunities just do not exist anymore."

"Things are tight and getting tighter," laments another.

Despite problems like smaller raises, limited advancement, and increased responsibility, food industry

Median Salary by Education

Ph.D.	$67,916
Master's degree	57,777
Bachelor's degree	47,699
Some college	42,285
High School or less	41,562

Source: Food Engineering 1991 Salary Survey.

Median Salary by Job Title

President	$95,999*
VP Manufacturing	75,713
VP Marketing	53,749
Plant Manager	52,499
Production Supervisor	41,874
Engineering Manager	55,454
Project Engineer	49,604
Purchasing Manager	44,999
Technical Director	58,749
Quality Control Manager	40,108
Food Technologist	38,815
Marketing/Product/Sales Manager	49,374
Sanitation/Maintenance Manager	50,999
Other	46,028

*The median salary level shown for president is suspect because most are self-employed or employed by small companies, and much of the compensation at this level is non-salary—bonuses, profit-sharing etc.

Source: Food Engineering 1991 Salary Survey.

Job Responsibility and Satisfaction

Have your job responsibilities increased in the last year?

	Male	Female
Increased	63%	74%
Decreased	4%	2%
Stayed the same	32%	23%

Rate your overall level of job satisfaction.

	Male	Female
Good balance of responsibility, salary and prospects	40%	36%
Two of the three factors	37%	43%
Only one of the three factors	15%	14%
None of the three factors	5%	6%

Percentages may not add up to 100 due to incomplete or duplicate answers.

Source: Food Engineering 1991 Salary Survey.

employees—with the major exception of women—are maintaining a relatively high level of contentment. Levels of job satisfaction experienced by workers over the past several years, despite the worsening recession, have stayed on an even keel. For example, this year nearly 40 percent of those surveyed indicated a high level of job satisfaction (defined as a balance of responsibility, salary and prospects), the same percentage as 1990.

Interestingly, satisfaction apparently varies inversely with educational levels. About 59 percent of those surveyed with a high school diploma or less expressed satisfaction with their work, while at the other end of the scale, only 36 percent of those employees with Ph.D.s indicated satisfaction.

Women constitute one significantly dissatisfied segment of the workplace. The survey indicates that they have been hit harder than men by recessionary fallout. While women constitute some 17 percent of the food industry's professional workforce, salary increases for them in 1991 averaged a meager 2.4 percent.

Also, while education levels are similar (for example, about 75 percent of both the men and women surveyed have college degrees) men continue to take home larger pay checks.

For instance, some 60 percent of the males surveyed make over $40,000, while only 24 percent of the

SALARY SURVEY

Median Salary by Region

Mid-Atlantic	$52,856
Pacific	51,718
South Atlantic	50,624
East South Central	48,749
Mountain	47,999
West North Central	47,691
East North Central	46,687
West South Central	46,249
New England	44,166

Source: Food Engineering 1991 Salary Survey.

Median Salary by Product

Pasta	$53,332
Beverage	53,046
Grain mill	52,940
Other	52,410
Fat & oil	50,832
Bakery	49,624
Fruit & vegetable	49,090
Seafood	48,749
Confection	48,249
Meat	45,207
Dairy	44,890

Source: Food Engineering 1991 Salary Survey.

Median Salary by Company Size

Small (1-249 Employees)	$45,713
Medium (250-2499 Employees)	46,749
Large (2500+ Employees)	52,027
All companies	49,088

Source: Food Engineering 1991 Salary Survey.

Median Salary by Experience

	Food	Total
Less than 6 years	$37,499	$34,903
6-9 years	40,881	40,999
10-14 years	45,624	44,814
15-20 years	52,916	51,922
21-24 years	55,594	55,118
25-29 years	57,726	57,272
30+ years	60,713	60,892

Source: Food Engineering 1991 Salary Survey.

women's salaries exceed this sum. In 1991, the median salary for men was $51,778 and for women, $37,364.

Some of the discrepancy is explained by the large influx of women into the food industry in recent years. While 20 years is the median level of industry experience for men, it is only 10 years for women, so a good deal of the salary inequities can be attributed to experience. But lack of experience does not explain all the discrepancies.

According to prior *Food Engineering* surveys, the salary gap between men and women, while substantial, had been narrowing as older men retired and younger women gained more experience. However, this year that trend has been reversed. While the median salary for men rose a low 2.8 percent in 1991, the increase was 0.4 percent larger than the median salary increase received by women.

And low raises are not women's only complaint.

"As a female, I feel I work harder for less money than my peers," asserts one respondent.

"In our company, in certain positions, males are paid up to forty percent more although they have less experience and education," notes another.

Still, on the positive side:

"While older female food company employees may still face discrimination, recent college graduates—women and men—appear to be making similar salaries here."

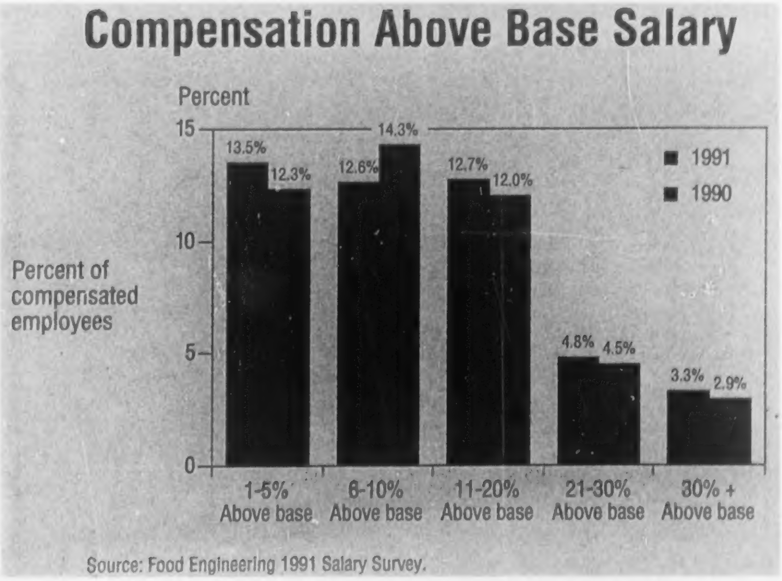
How do men feel? Well, several of those surveyed are crying reverse discrimination: "Advancement for white males is very bleak. Promotions here are not based on performance but rather on quotas."

While less satisfied with their jobs than their male counterparts, females on the whole are more satisfied with their jobs this year than last: 35.7 percent expressed satisfaction in 1991 compared to 31 percent in 1990. On the other hand, some 40.2 percent of the males, both this year and last, said they were happy with their work.

Besides tightening operations due the recession, food companies are also adjusting their focus. The shift is away from solely high volume production toward more high-tech, value-added, niche-oriented operations. Due to this refocus, the companies are trying harder to attract and keep employees with advanced degrees. Evidence of this effort can be seen in the size of the salary increases of those with advanced degrees compared with other food industry employees.

For example, according to the survey, the median salary of those with a high school degree or less in 1990 was $41,785; in 1991 it was a little worst: $41,562. College graduates fared little better: in 1990 the median salary was $46,372, in 1991, $47,699.

However, the median salary of someone with a master's degree was $52,082 in 1990, but $57,777 this



Compensation Above Base Salary

Source: Food Engineering 1991 Salary Survey.

year. Those with doctorates made $64,000 in 1990 and $67,916 in 1991.

As the figures indicate, food companies increasingly are rewarding education, but sometimes to the detriment of experience, say some respondents:

"Too many [companies] are wrapped up in degree requirements to fill positions so that many valuable potential employees are overlooked. One's job experience should have equal or more weight in judging one's abilities to perform a job...."

Many employees see the writing on the wall, however. In response to the survey question: "What is the greatest obstacle that might be stopping you from performing your job more effectively," a large number mentioned insufficient education:

"I'm about three semesters away from a degree in chemistry. I've worked in this industry for ten years, but experience doesn't mean anything anymore. Without a degree (and a B.S. isn't good enough anymore), it's impossible to advance or get your foot in the door of a new organization."

States another: "It's amazing how companies treat their most experienced people: with the lowest salary increases...."

And a third: "All our management people were told several years ago that no promotions above supervisor would be given to people without college degrees. This destroyed my incentive...."

While some are worrying about education, a few are simply concerned about survival: "It's difficult to work when each day they might shut the plant down."

To get their point across, some respondents turned to analogy: "My job is like the Vietnam War: Win the war but don't shoot your gun. You have no bullets (no authority)."

Others turn to paradox: "Salaries paid to lower-level management compared to union labor are not comparable."

Some expressed discouragement: "Call me a nice guy, but when somebody who is extremely pushy gets 50 percent more money because he has an MBA, I can get a *might* discouraged.

While others grew philosophical: "It seems as if we are all working harder and longer, but maybe I'm just getting older." Or: "I am happy with my job responsibilities and salary, and that's scary — from everything I read and hear, nobody is supposed to be happy with their job."

With the caveat that people, particularly those answering surveys, tend to accentuate the negatives and understate the positives, the underlaying tone of this year's survey responses was overwhelmingly bleak.

"Quality is not as important in a tough economy. Products that used to be rejected are now acceptable in order to cut waste. Very short sighted," cautions one.

Warns another: "I feel that food technology as a profession is a poor field — getting worse, and I do not feel this is a field for the future."

And a third: "The poor economy and numerous corporate takeovers have caused layoffs and consolidations that have greatly reduced morale and job satisfaction throughout this company as well as many others in this country." ▲

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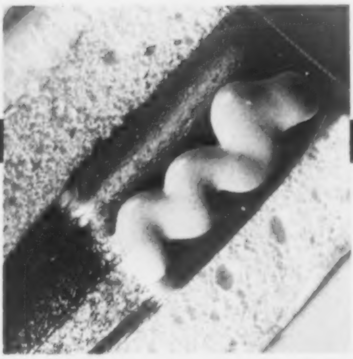

ABOUT THE COVER

Future foods, while retaining the appearance of traditional foods, will be composed of increasingly diverse ingredients. Even now, engineers are able to transform exotic fish protein into the traditional hot dog.

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ENGINEERED FOODS

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While Listeria has a high fatality rate, until now procedures used to test for the organism have been either inaccurate, insensitive or dangerous.

26 Dairy-based Fat Replacer Adds Flavor
Commercial Creamery Company's new fat replacer is off to a good start due to its unusual positioning.

26 Marketplace — Bioengineering
With the arrival of more bioengineered products, a smooth FDA approval system is critical.

31 Ion Exchange Removes Hidden Sodium
Ion-exchanged corn syrup is receiving renewed interest because of stricter labeling requirements.

32 Choices — Fresh or Processed?
Consumer food safety perceptions have flip-flopped recently. Fresh food is considered healthy but not safe.

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Dairy and food processors, distributors and suppliers from around the world converged on Chicago's McCormick Place for Food & Dairy Expo '91.

46 Social Concerns Drive Technology
Non-technical issues — competitive pressures plus social concerns — will influence engineering technology.

53 Freeze Concentration Promising
Phase I of a pilot project aimed at freeze-concentrating dairy products has produced some favorable results.

56 Online — Energy Control
The issue of energy and the need to manage it, just like the Loch Ness monster, will surface again.

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By unveiling a new state-of-the-art OPP plant, Mobil Chemical has positioned itself for future growth.

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Plain but eminently serviceable waxed paper may be headed for a marked renewal in popularity.

70 FMC Acquires Aseptic Equipment
FMC has entered the field of aseptic packaging through the acquisition of *Freshfill* technology and equipment.

71 Filler Features Double Indexing
A packaging machine at Food and Dairy Expo '91 fills quarts, liters and fractional sizes at high speeds.

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AWARD-WINNING
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... and lowering the sodium content

Also discussed at the FDLI's annual conference (see page 11) was the frustration food marketers experience attempting to advertise reduced sodium foods under the FDA's proposed guidelines. To be able to use the term "reduced sodium" the sodium content must be cut by more than half, under proposals of the NLEA.

However, Gayle Crose of General Mills said manufacturers traditionally reduced sodium in small increments to maintain consumer acceptance, and the ruling prevents use of the coveted "reduced sodium" descriptor for incremental reductions. Phil Lempert, president of Consumer Insight, Inc., questioned the necessity of using health claims on all products. Meanwhile, Kellogg's Marilyn Schramm, citing a recent Texas state attorney general's action against cereal makers, said that state attorney generals are no longer motivated by local concerns but are making **forays into the jurisdiction of the federal government.** (Ed. note: as of FE presstime, it was learned that Texas assistant attorney general Stephen Gardner, an outspoken critic of food manufacturers' health claims, had been asked to resign by state attorney general Dan Morales [who replaced Jim Mattox in January 1991]. The Morales administration is expected to back off from the aggressive advertising regulation spearheaded by Gardner.)

Consumers Describe How They Use Food Labels

92% read expiration label.

84% read ingredient information.

81% read nutritional information.

50% say present format is inadequate.

8% say manufacturers' statements are believable.

52% say manufacturers' statements are somewhat believable.

Source: Food Marketing Institute. Total exceeds 100% due to multiple answers.

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FOOD TECHNOLOGY'S EXCELLENT ADVENTURE

Engineering and R&D put a twist on 'everything old is new again.'

LETICIA MANCINI
TECHNICAL EDITOR

In preparation for this article, *Food Engineering* asked food industry executives what foods were in store for future eaters. One particularly thoughtful exec proclaimed, "Future foods are sometimes past foods in another form."

This is especially true in the case of restructured meats. According to Norwalk, CT-based Business Communications Company's report titled, appropriately enough, *Engineered Foods*, estimates of various types of these foods encompass a $6.5 billion market. This particular report discusses the market for engineered/restructured/substitute products which are primarily ingredients used in processed foods as well as various food products sold in the retail market. The report concludes that marketers will continue to cater to niches in the future, which should come as no surprise. What's new, however, are the hows and whys.

Many describe restructured technology as mature, but perhaps "evergreen" is a better word, referring to the wealth of new and improved applications. For example, a team from ABC Research in Gainesville, FL has recently discovered how to defat beef during the separation process, so that the restructured beef will actually have a fat content approaching that of turkey.

And turkey is one meat that is showing up a lot more than at holiday

dinners. Witness the success of Louis Rich *Turkey Bacon*. Made from chopped and formed turkey meat—where the white breast meat is the "fat" and cured thigh meat lends the familiar red color—a cooked slice has only 30 calories, but weighs 50 percent more than a slice of regular bacon because it doesn't shrink. Consumer acceptance has been high enough that other companies have introduced their versions of turkey bacon.

Looking a little farther into the future, consumers may come back to beef because of a new vaccine that makes it naturally lean. The technology has been developed, says Dr. Richard Gill of the British Technology Group USA, who is handling the licensing, "but people will need to overcome their wariness about science before we see it on the market." And yes, it works on humans, too.

But meanwhile: 'We're still getting too much fat from meat and poultry," commented Dr. Paul LaChance, professor of food science at Rutgers University in New Brunswick, NJ. "The American diet needs more Omega-3 fatty acids from fish." However, he noted that fish is too expensive to be a significant part of the average consumer's diet. "Fish needs to be farmed rather than hunted," he said.

Aquaculture is one way to bring down the cost of fish nutrients. Surimi is another. But will surimi really graduate beyind its narrow seafood salad niche? Unisea Foods of Redmond, WA is banking on it. The company has developed a finely textured surimi that can be baked and deep-fat fried without coming apart.

Bob Leavengood, vice-president of Unisea, attributes the enhanced functionality to the way the surimi shreds are processed. The shreds are extruded, then treated with an acid-setting solution that denatures the protein and helps the surimi to retain its shape. The product is then cooked, neutralized and shaped into nuggets. Breaded nuggets are sold to foodservice operations for frying. In fact, the nuggets are already featured in captain's platters in Northwestern seafood restaurants and in the fish and chips served to Seattle Seahawks fans in the Kingdome.

Don't have a cow

"There will always be some people who want an old-fashioned steak," said Rutger's LaChance, "but more and more people are exploring protein alternatives." Some upstart companies even go so far as to say, "Don't have a cow." That's the advertising theme for new rice and bean *Meals in a Cup* from Fantastic Foods in Petaluma, CA. Targeted to those who eschew meat (at least on a part-time basis), this product is rich in beta-glucan fiber which is believed to reduce cholesterol and the risk of heart disease. Similar products are targeted to the health-conscious who eat less saturated fat from red meat.

But even companies whose names

Foods of the future will look familiar enough, but will often be made with some novel or unexpected ingredients.

are synonomous with meat are exploring the meatless movement. Burger King is now testing a prototype veggie burger in focus groups. The soy-based burger, which is already available overseas, accounts for 6 percent of total sales in Burger King's British outlets.

Soy ingredients are used so often because of their versatility. For instance, tofu usage is growing because it can replace meat in casseroles, quiches and other processed products. Midland Harvest uses it in its *Italian Style Sausage*; it is also the main ingredient in *Great Balls of Tofu* no-meat meatballs.

New soy products developed and used first in Japan eventually find their way into the States. Attendees of the first Taste of Japan Trade show in Long Beach, CA got their first taste of *Kibi Yuba*, a new ingredient derived from boiled soy milk. This product lends itself to a myriad of recipes and surpasses even the protein content of tofu.

But the key to everyday use of these new ingredients is to develop products that the consumer is used to, much the same way that *Tofutti* gave many their first exposure to tofu. For instance, miso (another Japanese food made from soybeans) could be used as an ingredient in condiments, cheeses, salad dressings and spaghetti sauces, where it adds body, richness and flavor. "It minimizes risk," says Dr. Bruce Stillings of Durkee-French Foods, referring to the use of unusual ingredients in everyday products. "Companies today can't afford too many product failures, whether they're selling to a niche or a larger segment." Economics has never been more important.

FUTURE FOODS

Developing foods for fun and profit

One common denominator of future foods is the targeting of specialized segments. One interesting example of this principle is *OHIO PASTA*, a new "maparoni" made in the shape of Ohio and distributed by LAD Products of Columbus, OH.

The brainchild of Ohio State graduates Lisa Waite and Daniel Crowe, OHIO PASTA is shaped in the outline of Ohio with a small circle in the center denoting capital city Columbus, and spokes representing the state's major interstates. According to company legend, Waite and Crowe got the idea for the product while eating pasta salad at a Buckeye picnic. "Wouldn't it be great if we made a macaroni in the shape of Ohio," they said. Then they did it.

Despite its serendipitous beginnings, product development was a little more complicated. Waite and Crowe relied heavily on their backgrounds in computer aided design: Crowe designed the pasta shape on a MacIntosh computer and coordinated the casting of the die with a company in Brooklyn, NY. After three months of sending samples back and forth, they got the pasta's unique shape just right. Meanwhile, Waite was busy designing the attractive 6-color logo on *her* Mac. But they still needed to subcontract the manufacture.

Eighteen months after the picnic, OHIO PASTA debuted at the Ohio State Fair. The local press was intrigued with the idea, naming it "hottest new product"—not bad for a first effort. Sales have been brisk in and around Columbus' specialty food stores. And what's on tap from the makers of the first computer-designed macaroni? More Ohio products, of course.

Will a fat vaccine for cattle return consumers to red meat?

[redacted]

Engineered Foods Market Forecast (in billions of dollars)

	1988	1993
Surimi-based seafood	$.13	$.20
Soy protein ingredients	.50	.55
Dairy substitutes	1.50	2.06
Engineered fats/fat replacers	.45	1.60
High intensity sweeteners	.80	.88
Restructured meats, poultry	1.00	2.00

Source: Business Communications Co.

'What if' foods

Having already identified their target niches—whether it's vegetarians, the calorie-conscious or children—through consumer research, food companies are faced with developing successful new products on a tight budget.

"The first thing we do in a brainstorming session is ask the question 'what if', as in 'what if we played around with the machinery?'" said Barry Wegener of Betty Crocker in Minneapolis. Wegener explained that several new fruit snack products were developed that way. For instance, *Crazy Colors* were born when one engineer decided to take the company's *Garfield* fruit bits and run them through a flat press.

"Basically what we do," said Wegener, "is look at the research, look at what appeals to our market—kids—and look at the capabilities of our machines." Past favorites like the race car and teddy bear fruit snacks may have become this year's *Sodalicious* (tiny bottle-shaped fruit snacks that taste like soda), with minor modifications to the machinery and flavor formulation.

Economic forecasts indicate that modifications and line extensions will be the way many new products are introduced for the next five to ten years—and companies that develop a family of successful products can expect them to be knocked off by competitors.

Bruce Stillings distills it even further: food companies will be classified as innovators or copycats in terms of new product development. "Companies that can afford to spend money on R&D, like General Foods, become the innovators, while smaller companies will succeed by finding niches."

A perfect example is Ralston-Purina. While it is a strong company in its own right, it is overshadowed by the cereal giants, General Mills and Kellogg's. Ralston has gained industry attention by unabashedly pursuing short-term profit with its line of ready-to-eat licensed character cereals. Cereals like *Bill & Ted's Excellent Cereal, Prince of Thieves* and *The Addams Family* can make money for the company without a significant investment in R&D.

Mood foods

Stillings sees "low technology" being more of a force in the future because of regulatory obstacles, such as those faced by healthy foods formulators (see Nov. '91 *FE).*

Rather than go the costly and time-consuming nutraceutical route, some companies are finding success through promotion of ingredients, rather than claims. By selling to an informed consumer base who knows that ginger relieves stomach upset, and ginseng is a pick-me-up, traditional medicinals are becoming big business.

Already, several products are beginning to venture out of the health food stores. One product that distributors are finding hard to keep on the shelves is Fischer Brewery's *Beer of Love*. Made in France (where else?), the product is described as "the beer for intimate occasions" because it contains several herbs known for their—shall we say—*stimulating* effects.

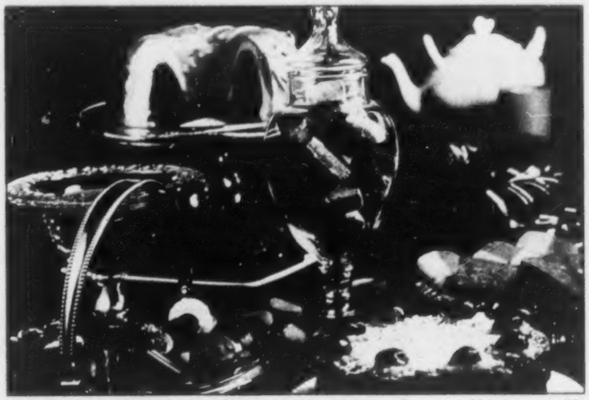
Don't laugh, says Linda Gilbert, president of HealthFocus in Emmaus, PA. "These kinds of 'mood foods' are based on East Indian phytotherapy, used for thousands of years. In fact, many of today's phar-

Here's to your health: engineered chocolate

There are those who think of chocolate as a basic food group and those who avoid it because of health problems like allergies. Now the latter group can be chocolate lovers too, with a new process currently available for license from British Technology Group USA in Gulph Mills, PA.

Dr. Leonard Girsh, a Philadelphia immunologist in partnership with BTG USA, has developed a process for removing the protein allergens in cocoa powder that can cause reactions like rashes, eczema, migraines or even death in both children and adults.

Under high temperature, high pressure conditions, the proteins in the cocoa powder are denatured rather than extracted so that the finished chocolate product will taste the same as ordinary chocolate.



Don't be surprised if chocolate is used someday to prevent disease.

[redacted]

So far hypoallergenic chocolate is available only as the dark, bitter type (since the milk in milk chocolate is also a potent allergen), but can be sold as a bar or as an ingredient for other foods.

And for those concerned about calories and dental hygiene, a lot of other scientists are at work developing "good-for-you" chocolate:

- Introducing *Chofu* – the tofu candy bar. These bars have less fat and sodium than regular milk chocolate, but offer high protein content because the milk solids have been replaced with tofu.
- Scientists down under at the University of Melbourne have discovered a tooth decay-fighting protein that can be used in chocolate and other high-sugar foods. The protein is already patented in the U.S. and is expected to become commercially available within three years.
- And finally, the Canadian Department of Defense has funded research to develop the *Canadian Cold Buster*, an all-natural chocolate bar that prevents hypothermia (low body temperature).

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maceuticals came from plants. Valium comes from valerian which was often used in ancient cultures to induce sleep."

Another category of foods rooted in Eastern cultures is functional foods, which were first developed in Japan. To be called a functional food, a product must contain one of the 14 recognized physiologically functional ingredients, such as oligosaccharides, sugar alcohols or lactobacilli, in active form and at a dose-effective concentration.

"This concept is of particular interest to the dairy industry," commented Kurt Frey, manager of nutritional ingredient marketing at New Zealand Milk Products and its OPSON nutritional development arm in Santa Rosa, CA. "Milk is often cited as a good potential source of physiologically functional ingredients." Frey noted that research into milk-derived bioactive peptides indicates that they aid digestion, pain relief and mineral absorption.

This new information prompted the Japanese Ministry of Health and Welfare to create a new class of foods known as Specific Health Care Foods. They will be administered by the Environmental Health Bureau of Ministry of Health & Welfare, under the umbrella of the Nutrition Improvement Law. Frey explained that the latter law has existed for some years and was recently amended to incorporate regulation of this new class of foods.

Japan has addressed its increasing aging population and rising health care costs with this law. America is faced with a similar situation. Food science has developed a host of functional and high-performance, healthy fabricated foods in response. The question is, what role will our government play in the marketing of these foods to tomorrow's consumer? ▲

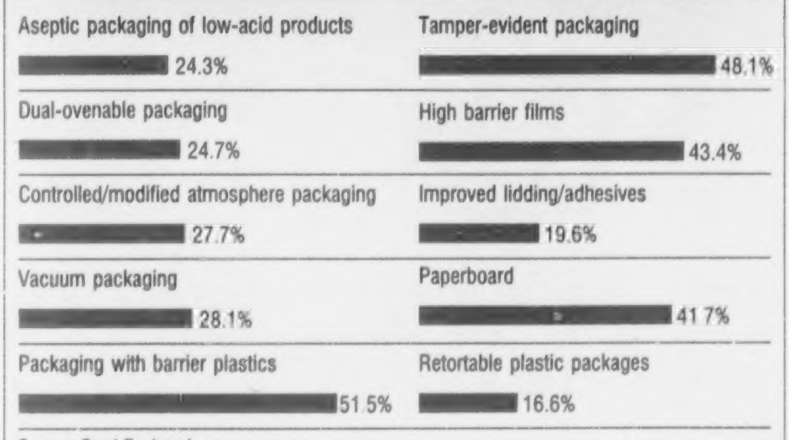
PACKAGING BUYERS SURVEY

CONTINUING IMPROVEMENT

DESPITE THE DOWNTURN

Packagers continue to look for improved barrier materials in primary packaging and energy-efficient machinery to minimize costs.

MARGIE J. RUSSELL
TECHNICAL EDITOR



Important Packaging Areas

Respondents were asked to check the areas of food packaging likely to be of most importance to their companies over the next two years.

Source: Food Engineering.

Environmental issues may seem to be at the forefront of the packaging sector right now, but they are not drastically affecting the wishes and desires of *Food Engineering's* Executive Advisory Panel. Responding to the sixth Annual Packaging Buyers Survey, the more than 500 members of the Board told us that the areas of food packaging likely to be the most important for their companies over the next two years were high barrier films and packaging with barrier plastics. They also had some requests for the future developments including:

- "High barrier films for moisture retention in soft candies. Higher quality graphics for better P-O-P presentation." —product development manager for a candy company.

- "Better barriers for pure-pak and bag-in-box dairy products."—vice president and general manager for a Northeast juice company.
- "Switching non-barrier packaged products into barrier packages. Switching some packages so they become more environmentally friendly."—director of research and development for a pet-product firm.
- "Improving barrier properties. Improving shelf presentation. Adaptation to new technology."—director of engineering for a Midwest food processor.

But there may be a price to pay for these high-barrier, high-tech films: environmentally-acceptable disposal. For the past two years, the green movement has been rearing its head and showing up in the answers of our panelists as they become more concerned about the final destination of their packaging materials.

There are, however, no compromises here: Packagers still want the best materials for their products, but these materials must be disposed of easily or recycled, which, in itself, is no easy job. In responding to a question on the survey concerning changes in primary packaging materials and package designs in the next year, a number of respondents gave some thought-provoking answers on packaging and the environment. A technical director for a Midwestern food company claimed "my company will be changing plastic resin due to environmental legislation (recyclability) in some areas." A director of packaging systems for a large processor noted that "we will be upgrading quality and addressing environmental issues by going to more friendly materials and/or source reduction," and a corporate packaging manager said that packaging changes would be occurring to make materials more environmentally acceptable, emphasizing source reduction and reusability.

Emphasis on machinery

Even though one panel member exclaimed that his firm was "trying to find equipment that works!," by far the most important requirement for packaging machinery, as reported in our survey, was speed. Many panelists responded they were making machinery changes in order to acquire newer, faster models and to prepare for new product line installations. Panelists also relayed the need for their lines to become more efficient by reducing labor and increasing output.

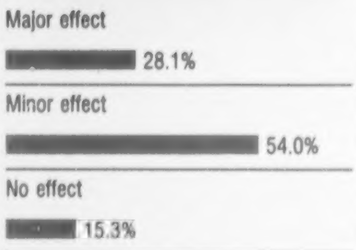
"Technology updates" and "automation" were dominant responses to the question concerning expected changes in packaging machinery for the next year. Automation is now viewed as a "critical need" in many packaging lines, but our panelists' reasons for why they needed it were varied. Accuracy, speed, and reliability were the three most common needs cited for adding automation to a line, but some panelists also mentioned they were interested in quality, yields, and the ease and cost savings of improved maintenance. Several also mentioned the need for automation in order to: more accurately inspect for defects, achieve "corporate standardization," and remain competitive and ahead of the competition.

Looking at a few of the specific, critical needs of our respondents, one panelist listed his automation requirements: "labeling, portioning of product into packaging machinery, and sanitation in the packaging area since automation means less people and less product contamination." The most critical needs for automation that a corporate industrial engineer for a Northeast food company has are: sorting out glass jar rejects and justifying palletizers on an individual packaging line with low output. And, a technical specialist with a major food processor noted that his company needs "automation with reliability and automation that can be understood and maintained by the current staff (with training). It should not be over-automated."

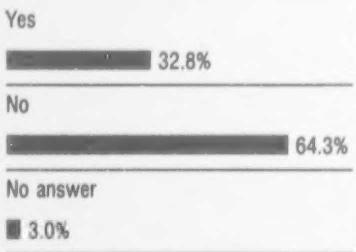
Our survey this year also asked our Advisory Panel if they were willing to pay the extra cost for automation on

Economics and Changes

Respondents were asked what effect the economy may have on their company's purchase decisions during the next year.



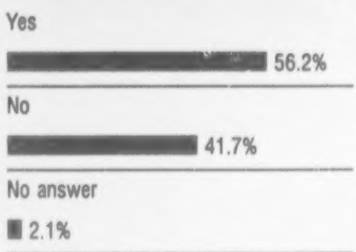
Respondents were asked if their firms are planning on changes in primary packaging materials or designs for any products during the next year.



Source: Food Engineering.

Environment and R&D

Respondents were asked if any environmental issues to date have affected R&D of new packages at their companies.

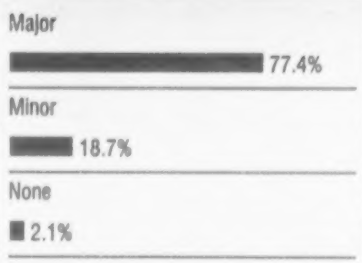


Source: Food Engineering.

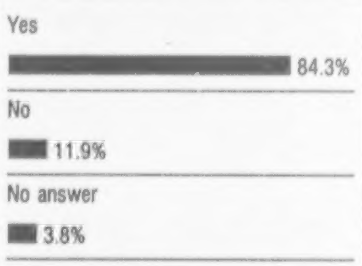
PACKAGING BUYERS SURVEY

Influence and Cost

Respondents were asked what influence automation has on the purchase decision of new equipment.



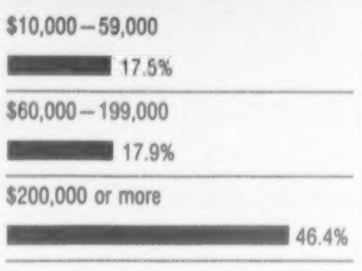
Respondents were asked if they were willing to pay the extra cost for automation on new equipment.



Source: Food Engineering.

Spending Trends

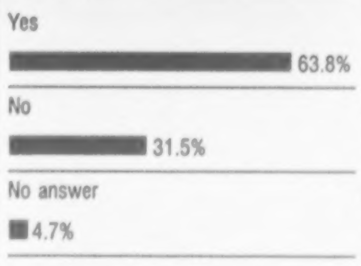
Respondents were asked to indicate expenditures on equipment in 1992.



Source: Food Engineering.

Bans and Taxes

Respondents were asked if packaging bans and/or taxes would have an effect on their company's position.



Source: Food Engineering.

new equipment and why they feel this way. A whopping 84.3 percent of the panelists responded with a resounding "Yes!" and gave various reasons why. "The payback makes up for initial investment and saves in the long term," said a Midwest product development manager. Many panelists responded that automation generally offers a more consistent end product and if the payback indicates that it is going to generate sufficient savings, then an automation purchase is definitely worth the cost. But a plant manager of a turkey processing company was cautious about jumping on the automation bandwagon and responded that "we would cost out the labor savings versus the cost of the automation and make our decision based on the numbers."

Several of our panelists were also willing to pay for automation in order to reduce operator error in set-up and changeover. Many respondents replied that their companies were looking out for employees in the long run as well: automation can mean fewer injuries to people by eliminating repetitive motion problems. And, a number of panelists justified automation in memorable quips: "Good help is hard to find" (technical director) and "machinery does not call in sick or take coffee breaks; automation runs efficiently" (plant manager for a coffee company).

Who buys?

Out of 214 respondents who answered the question "Who in your company (by title) is most responsible for packaging machinery purchases?" the 65 panelists in the engineering area represented the largest group involved in making machinery buying decisions. This group included corporate engineers, directors of engineering, engineering managers, and plant engineers. Those in the production/manufacturing section were second in the purchasing area, as 51 panelists with tiles such as operations manager, production manager, vice president operations, and vice president manufacturing reported buying machinery. Presidents and general managers are also responsible for purchasing machinery, as 37 respondents in the administrative/general management area told us that they buy machinery for their plants. The packaging department came in next (20 respondents) as the director of package engineering and packaging engineers gave the approvals to buy machinery.

Future wishes

Our panelists receive the opportunity in the survey to compile a wish list of materials or machinery that they have been unable to find. And, as expected, the respondents are looking for what most in the industry are looking for: superior materials and packaging systems with acceptable cost lines that can be environmentally positive in the long run. Some examples:

- A senior project packaging engineer asked for "a low cost rigid package that can be recycled and uses very little energy to produce or recycle. It must protect our products for a minimum of one year shelf life."
- A Midwest specialty manufacturer's wish list included a clear plastic material with high barrier properties that is environmentally sound. The material should be able to be burned like low sulfur coal to run electric plants.

FE's Packaging Buyers Survey costs $125 and is available by contacting Anne Hartnett at 215-964-4444; fax: 215-964-4273. ▲

SPECIAL
EMPHASIS:
**SNACK
FOODS**

Life In The SNACK

Even in the midst of a recession, snack sales hum along in high gear. Favored flavors continue to be dairy-based and interest accelerates in low-fat flavor systems.

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

Snack sales in 1990 were bullish with sales topping $12.6 billion, an increase of 6.2 percent over 1989—incredible growth, keeping in mind that we are in a recession. One explanation attributes this shining performance to the fact that snacks offer consumers a way to trim costs by entertaining at home. Also, the movement toward snacking has been reinforced by the pre-recessionionary trend toward cocooning.

Market leader Frito-Lay, Inc. created a new snack food category with its *Sunchips* multigrain snacks, which continue to be test marketed in regular and now, bite-sized versions. Next year number two snack marketer, Borden, Inc. will challenge Frito Lay with its own wheat, corn, oat and rice-extruded snack, according to George Waydo, Borden's president, snacks and international consumer products. Waydo told *FE* that he expects multigrain snacks to become as big in the future as tortilla chips are today, adding that both were relatively unknown to the U.S. market just a short time ago. Borden also plans to intro-

Dairy-based flavors are the most preferred for snacks. Blending a variety of cheeses and spices creates tastes such as mild cheddar, sour cream 'n chive, Jumping Jack and nacho. (Source: Kraft Food Ingredients, Inc.)

[redacted]

LANE

O-shaped cheese snack.

In a move away from its traditional reliance on regional brands, Borden introduced *Snack Time!*, a national line of single-serve snacks.

Back to basics

Although snack sales are booming, if it doesn't taste good, it won't sell. Flavor and seasoning researchers play an essential role in snack success. And what are these specialists saying about the direction of snack foods? First, the hottest selling flavors continue to be classic dairy-based flavors, according to all of the flavorists polled by *FE*.

"Dairy-based flavors are always the most popular, no matter what type of ethnic variation," said Rich Doremus, Dell Flavors & Seasonings (a Beatreme Company), director of R&D. "Interest remains in sour cream, cheddar and spiced up versions of dairy-based flavors, such as nacho." He added that regional snack companies are more creative, with red pepper being hot in Detroit and oriental mixes with soy notes popular in the East. These flavors would never go national because regional variation is as American as apple pie.

In Southwest, Midwest and Pacific Northwest markets, Frito Lay unveiled an exotic new flavor for its restaurant style *Tostitos* chips—lime 'n chile. At first bite, the chip has the tang of lime, followed by the heat of hot chile.

Another unique taste which is gaining popularity in Northeastern markets is salt 'n vinegar. Both Borden and Eagle added salt 'n vinegar to their potato chip lines. Also, barbecue continues to be strong, according to all but one of the flavor specialists polled by *FE*. Other exotic flavors:

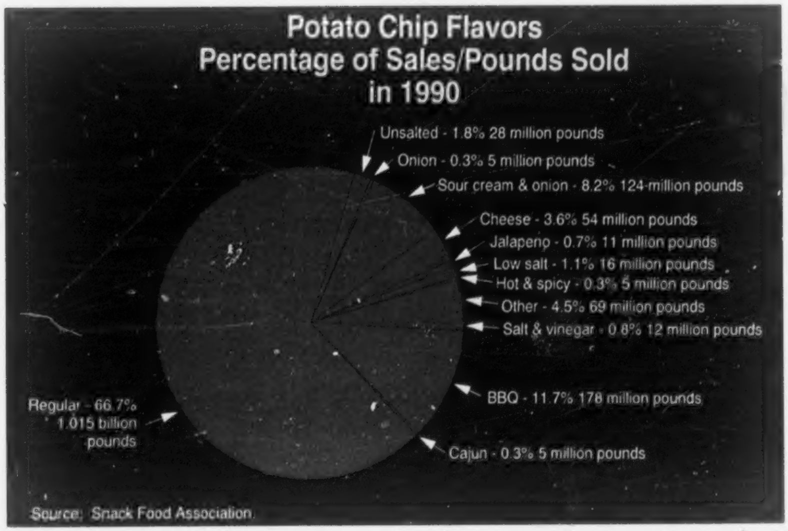
- Key Lime was exhibited at the IFT this year by Dell Flavors & Seasonings. Also, fruity character notes with white cheddar on popcorn is being tried at Dell.
- Pizza flavoring for potato chips, and lemon and salt, and honey cinnamon for tortilla chips were offered at the IFT by Georgia Spice Co., Atlanta.
- Chicken/biscuit flavor and dill pickle flavors for potato chips are being worked on at Heller Seasonings & Ingredients, Inc., Bedford Park, IL.
- *Morning Munchies* by Charles Chips, Inc., Lancaster, PA are a cinnamon- and maple-flavored extruded snack that conjures up the tastes of breakfast. It is packaged in a recyclable and dishwasher-safe plastic tub.

Lightening up

Frito-Lay reports continued success with its low-oil chips, with the exception of low-oil *Doritos*, which had to be reformulated. As a result, other snack food companies are also seeking ways to reduce the amount of saturated oil in their chips. Some are going about it by using cottonseed oil and to a lesser degree, canola oil, said Bob Haywood, sales manager at ADM Refined Oils, Decatur, IL. The most common solution is to either bake snacks, or to fry them quickly and bake them to drive off excess oil.

Frito-Lay introduced its cracker/snack chip in 1991 that was marketed in both the salty snack and cracker aisles. (Source: Frito-Lay, Inc.)

Another way to cut the fat is to use less saturated fat in the oil used as a carrier to mix with the flavor or seasoning that is sprayed onto the chip. Or, to spray less oil onto the chip before the seasoning is sprinkled onto it, said Mary Jens, senior food technologist at Kraft Food Ingredients, Memphis, TN. Another trick is to sprinkle cheese flavoring onto the product while it is still hot from the oven so



Source: Snack Food Association

With sales of $4.1 billion, potato chips remain king of the snacks. Flavor popularity varies with parts of the country.

more cheese flavoring will stick and less is needed, she added.

Although most of us are used to lots of solids at the bottom of a bag of chips, lighter formulations at Dell concentrate the flavor so less solid is used, according to Doremus. "Also, to cut down on oil, we're trying to get away from using oil-based slurries in seasoning," he added.

Two areas of utmost importance when formulating low fat systems are the flavor and mouthfeel from the flavor carrier (which normally contains fat), said Ted Foti, marketing director at McCormick Flavor Division, Hunt Valley, MD. The idea is to replicate the full body taste of the fat carrier within the flavor itself, he added. "It takes a lot of trial and error and there's no standard formula. A different solution is needed for each application," Foti said.

Usually when a company wants to make a low fat claim, it also wants to make a low salt claim, said Kathy Connolly manager of product development at Heller. At the same time, suppliers have been getting requests to "increase salt perception without using salt," said Mike Hudson, supervisor of food applications at Provesta.

In the past, MSG was used to enhance flavor; however, many food processors now are deemphasizing it. Lately, MSG has gotten bad press from a *60 Minutes* program. However, many of the flavor specialists feel the negative publicity is unjustified since MSG is claimed to have ill effects only on those few people who say they are allergic to it.

"Some people are allergic to peanuts and they don't take them off the market," said Doremus, who added that products with MSG should simply be labeled so individuals who are allergic can avoid them.

Meanwhile, the flavor houses that specialize in MSG alternatives reported receiving a flurry of inquiries in response to the *60 Minutes* program. Most of the inquiries came from companies that are positioning their products as health-oriented and are concerned about public perception of MSG on the label. However, all of them have not reformulated since many are awaiting FDA's ruling on labeling to see how MSG and its various alternatives must be listed, said Percie Lamar, Flavorite's Memphis, TN market development manager.

Meanwhile a vast majority of those polled by *FE* said they noticed a slight but steady increase in the amount of requests for kosher snacks. Statistics from Lubicom, a New York-based marketing firm, show the number of kosher products made in 1987 equaled 16,000 and by 1990 that number swelled to 21,000. Sales of kosher products grew from 1987's $1.5 billion to over $1.75 billion by 1990, according to Lubicom.

Less than a third of those who buy kosher goods are Jewish. Most are simply consumers who perceive kosher products as having freshness and quality. Most of the flavor specialists contacted by *FE* reported a slight, but steady increase in the amount of kosher requests.

Kosher ingredients

However, making kosher snacks is more complex than it sounds. Before a cheese powder can be made, the cheese must have been aged from six to 12 months and processed under kosher supervision which adds both time and expense to cheese-based kosher snacks, said Jens. However, the extra effort is worthwhile to gain access to the kosher market, said Flavorite's Lamar. This long lead time emphasizes the importance of careful coordination between food manufacturers and ingredient suppliers to ensure a smooth market introduction of complex products, such as kosher foods, Lamar added.

And, in case you ever wondered what the difference was between kosher and pareve: Pete Friedman, vice president of R&D at Flavorite said a kosher product may contain dairy ingredients (which to a kosher Jew would be unacceptable to eat with meat products). A pareve product is prohibited from containing dairy ingredients (which would make it kosher to eat with a hamburger).

So, whether the focus is kosher, low-fat, or exotic new flavors, snack ingredient R&D will have to keep on its toes. And with more consumers staying home to snack, coming up with new and innovative snack products certainly seems to be a profitable and worthwhile effort. ▲

CHILTON'S

FEBRUARY 1992

FOOD ENGINEERING

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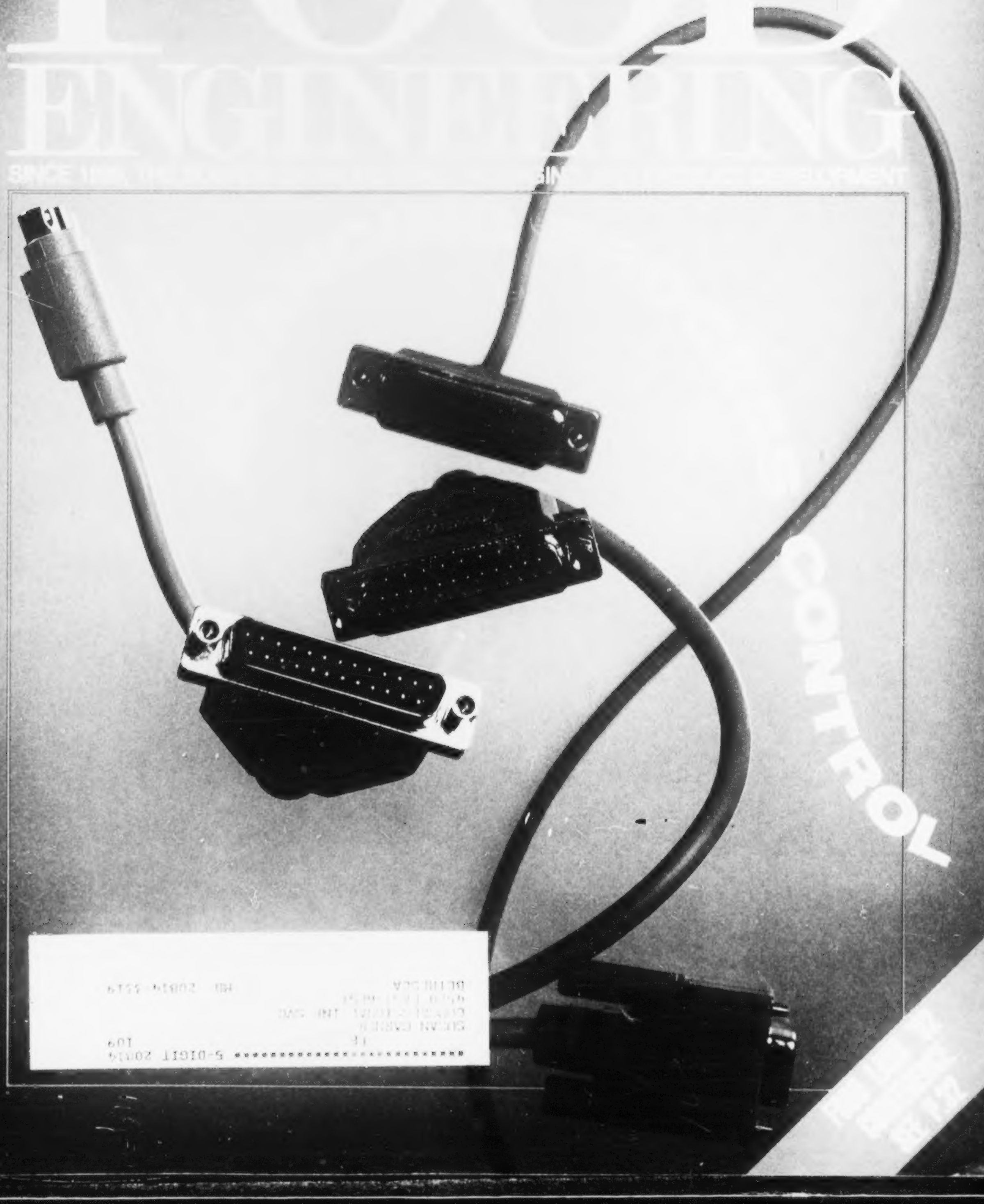

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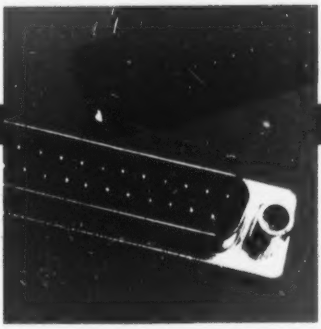
FOOD ENGINEERING



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Integration of food processing operations continues its fitful advance. Companies with islands of automation often are hesitant about committing to more advanced integration—with good reason.

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HERB DEW

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JESSE H. NEAL
AWARD-WINNING
EDITORS

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FUTURE
FOOD
WORKERS

PREPARING THE WORKFORCE FOR TOMORROW ...OR PERHAPS THIS AFTERNOON

"The world has changed. A strong back, the willingness to work and a high school diploma were once all that was needed to make a start in America. They are no longer. A well-developed mind, a passion to learn and the ability to put knowledge to work are the new keys to the future of our young people, the success of our businesses and the economic well being of the nation."

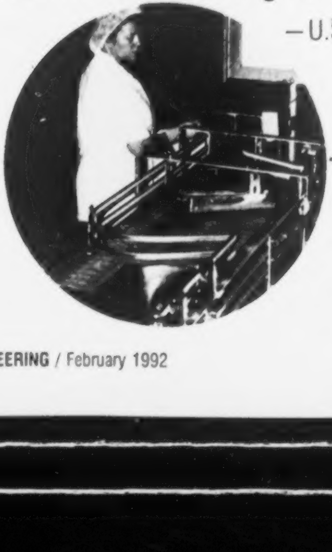
—U.S. Department of Labor report

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

Workers are no longer being asked to leave their brain at the door and simply do what the boss says. Automation and a new mindset have arrived to demand a better educated worker who takes an active interest in how the job gets done.

Automation brings with it computerized equipment that needs to be operated by people who have the basic math skills to learn statistical process control. And this equipment must be maintained by specialists trained in electronics.

At the same time, workers are being asked to make decisions formerly made by somebody who used to look over their shoulders. While some companies are giving line workers more authority because of mid-management layoffs, other companies discovered years ago that an empowered workforce is far more quality conscious than a zombie workforce. These companies acknowledge that workers know their jobs better than anyone and their expertise is valued to make the manufacturing process as efficient as possible. In fact, companies that continue to operate under

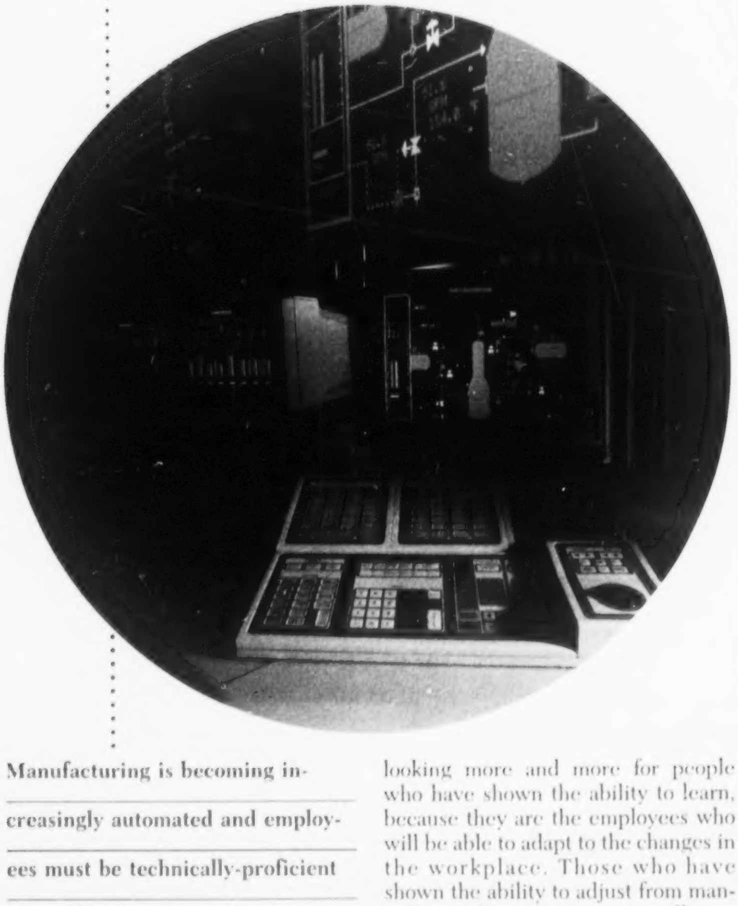


Close attention to training and employee involvement have maintained high efficiency and morale at Campbell Soup Co.'s Maxton, NC plant.

FUTURE FOOD WORKERS

the traditional assumption that workers are brainless will be out of business, according to several managers interviewed by *FE*.

Leading edge companies are setting standards that will be followed over the next ten years. In a nutshell, workers must be "highly skilled, flexible, and ready to solve problems through greater access to information," said Jim McConnaughay, vice president of operations and human resources at Golden Grain, San Leandro, CA, a subsidiary of Quaker Oats, Co.



Manufacturing is becoming increasingly automated and employees must be technically-proficient to run the equipment. (Source: Rosemount, Inc.)

"Over the next ten years, we will be looking more and more for people who have shown the ability to learn, because they are the employees who will be able to adapt to the changes in the workplace. Those who have shown the ability to adjust from manually stacking cases on a pallet to managing the needs of their equipment are the ones who are succeeding," said Michelle Beale, senior vice president, human resources and public affairs at Coca-Cola Foods in Houston, TX. Even forklift operators at Coke have grown from simply transporting goods to identifying the product, entering records into the inventory computer and defining its location in the storage system.

The beverage industry changes rapidly to meet consumer demand, said Beale. This exerts pressure on employees to be able to learn something new "tomorrow or even this afternoon," she added. "If today, employees have to operate a computer by making selections from a menu, tomorrow they may have to program the machine."

In the future, workers will be adapting to physically different plants. Plants will be "brighter, cleaner, highly-automated operations which will be smaller in size yet have the same capacity of many of today's plants that were built in the days following World War II," said Mike Broll, vice president of operations for desserts and specialty products at Pillsbury's Murphysboro, TN plant.

Beverage processing plants, which are highly automated, can expect to "require less manual care. Surfaces will be more resistant to soil, equipment will be easier to sanitize and the flow of production will more closely represent a straight line. Electronics will play a big role in the process and there will be a concomitant need for skilled technicians to maintain it," said Beale.

Workers who will successfully fit into modernized plants must upgrade their technical proficiency. Line workers need the basic math skills to learn statistical process control. Maintenance crews need better electronic skills in addition to basic mechanical skills. Workers will be expected to be multi-skilled to run different pieces of equipment, said Pillsbury's Mike Broll. "And On-the-Job training isn't enough to train people," he added. Many managers interviewed by *FE* said they seek vocational school or community college graduates. Many

Educating your present and future workforce

Progressive companies educate both their present workforce and look to the future by taking an active interest in the school system, since its students will eventually apply for work at the plant.

But first, a look at one aspect of Campbell Soup Co.'s training at its Maxton, NC plant. Loretta Hoeffner, manager of training, and Donna Norris, training coordinator at Maxton, interview the more experienced operators to develop a binder full of procedures for doing the job right. It includes nuances that only years of experience reveal and excludes the obscure garble that often litters suppliers' user manuals. Once completed, the operators review the trainer manuals for accuracy.

Interviewing operators also helps identify the best candidates to become trainers. "Sometimes, the most experienced or technical people are not the best teachers," said Hoeffner. "Employees see becoming a trainer as a form of recognition and an opportunity to help others and grow professionally," she added.

Training new hires in a noisy production environment is difficult, especially when both parties wear earplugs. As Hoeffner said, often people nod in agreement even when they haven't heard what was said. To counteract that, trainers and trainees spend a limited amount of time on the production floor, then return to a quiet classroom to review key points.

Having the manual and a method of training relieves some of the stress some trainers feel trying to teach their fellow employees and it also bolsters their confidence.

Training yields extra dividends. Both Hoeffner and Norris said the packaging area was stressful because any delay represents the possibility of losing 80,000 cans of soup. Training provides a relaxed atmosphere for employees to focus on what they need to learn.

Hoeffner and Norris have completed compiling information for the labeling training manual and now are working on filling and cooking. They will go through the plant, and once finished, start the process all over again to update the manuals as new equipment and procedures are added.

What was the hourly employees' reaction to this new vigorous program? "People wished we had done this kind of training sooner," said Norris.

The manuals also serve as the foundation for job descriptions so employees know what is expected of them and management has a better appreciation of what they do.

Campbell's scope goes beyond its own walls. Traditionally, in the rural South, education has been secondary to the demands of agricultural work. However, in Scotland County (pop. 23,073), Campbell Soup, along with nearby Eaton Co. and Abbott Labs, has taken a very proactive approach to improving local schools and their students who eventually apply for jobs at the companies.

Management and hourly employees are encouraged to get involved with school and community groups. On a recent rainy January morning, Ed Krystek, manager of systems at Campbell, attended a meeting of local school principals and department heads who were deciding how to solve problems with bus driver scheduling. Krystek maintained a low profile throughout the meeting, whispering only a few suggestions to Mac Forde, Scotland County High School assistant superintendent, as to how to handle conflicts that arose.

While buses may seem to be a mundane educational issue, by helping schools resolve conflicts with proven industrial techniques (such as Deming's and Taguchi's), Campbell is building a long-term relationship with the schools. During the summer, a teacher interned at the company. Returning to teach, she now has a better idea of what the corporate environment is like and how to prepare her students for it.

High school students from nearby Scotland County and Robeson County also visit the plant on career days. In addition, Campbell encourages its hourly employees to visit schools to encourage kids to complete their education.

In cooperation with the state of North Carolina, Campbell has established an apprenticeship program for its maintenance and can manufacturing mechanics. It is a four year program that costs the company $50,000 per employee annually. Currently, three maintenance workers and two packaging workers are enrolled. They work third shift so they can take classes during the day.

lament the low status of vo-tech education in the U.S. and wished that an apprenticeship system was in the U.S. (see sidebar above).

Today's average food worker has some high school education, but by the year 2000, a high school diploma or general equivalency diploma (GED) will be a minimal requirement. Currently several companies encourage or pay for the costs of earning a GED. In addition, basic skills must be improved. "We need employees who read and understand English well, handle math, solve problems and work well on a team," said Alan

Miller, senior operations officer, chief administrative officer at Borden, Inc.

Campbell Soups' Maxton, NC plant has taken training and education of its present and future workforce very seriously (see sidebar on page 95). "In American industry for years past, people clocked in and left their brain at the door and we used their backs for eight to ten hours a day. And when they clocked out, they picked their brain up and left," said Fred George, vice president manufacturing of the eastern region. "Well, we're not hiring people for their backs any longer. We're hiring them for their minds." George and his staff are very active in spreading the education gospel to state legislators, other industry leaders, civic groups and businesses. "We've got to get involved in the education system, financially and personally, to generate the high tech worker of the year 2000: a quality-minded, service-minded, technically-oriented employee or we're all going to be working for overseas companies," George said.

Golden Grain employees volunteer to tutor at San Leandro's James Madison Elementary School while the company provides IBM computers and office furniture. "We can't assume our tax base money will be enough for schools to turn out the people we would like to employ. We must be active in community programs and assist the schools," said Golden Grain's Jim McConnaughay.

In addition to boosting education in the basics, some companies must face the additional challenge of dealing with illiteracy or foreign-speaking employees. Using pictographs to design around illiteracy was offered as a temporary solution by Arthur D. Little's Bill Morgan. Most of the companies *FE* interviewed feel these employees are valuable and want to contribute to the company, so the companies make training opportunities available. "English as a Second Language" and reading classes are given at many of the interviewed companies' facilities and employees attend on a volunteer basis on their own time.

Seven percent of the 300 people

"You feel better about yourself having a direction and knowing where you're going," said Jody Maxson, maintenance technician, referring to Golden Grain's training/incentive program.

Si~~st~~ers, Parents, unite!

While food plant production areas are rich in diversity in terms of Hispanics, blacks, whites, Asians and Indians, management remains very much white and male. Interestingly enough, most food companies' workforce is 60 to 70 percent female. Yet, while providing excellent health benefits and showing great concern for workers, most major food companies have no provision for day-care—traditionally considered a 'female problem.'

However, as the generation of the two-income family makes inroads into boardrooms across America, day-care for children and elderly parents will be addressed, according to Bill Morgan, senior consultant at A.D. Little, Boston, MA.

Future day-care may result from a cooperative arrangement between several companies rather than being the exclusive response of one company, said Jerry York, factory manager at Ore-Ida Foods, Inc.'s West Chester, PA plant.

However, the future has arrived at Hatfield Meat Co. in Lansdale, PA. "We've had day-care since 1985," said Steve Moyer of human resources. Day-care was instituted after Hatfield's president strolled through the plant and heard many people voice concern about how they had trouble finding child care.

So, Hatfield converted a house it owned across from the plant into a licensed educational day-care facility that employs eight full-time teachers. The company pays competitive wages to minimize the traditional 100 percent turnover that plagues minimal wage day-care workers. Sixty-five children attend along with five latchkey children who are dropped off after school.

The company subsidizes the facility up to $50,000 per year with parents paying the balance—ranging from $70 to $100 per week. In response to critics who ask why employees without children would want their company subsidizing day-care, Moyer said no one has complained.

Day-care is really no longer a 'female problem' since single parents of both sexes and dual income earners share the same worries about arranging childcare. "Arranging childcare has always been a stress-producing situation for parents," said Moyer. "And onsite day-care relieves much of that stress," he added.

"People are very enthusiastic about the program," said Parmjit Khaira, a trainer in Golden Grain's training program.

employed at Ore-Ida Foods, Inc.'s West Chester, PA plant participate in voluntary state-funded "English as a Second Language/Adult Basic Education" classes, according to Jerry York, factory manager. GED assistance and literacy training are also provided. The factory uses rainbow-colored temperature charts since they are more easily understood than traditional SPC charts.

Borden's Alan Miller has been very pleased with the participation in English classes. Many of the Vietnamese and Cambodians study English on their own time and have made amazing progress, he said.

The future is here

Tomorrow's and in some cases, this afternoon's workers are also being challenged to adapt to an entirely new philosophy: one that asks them what they think. Workers are joining teams at Pillsbury. Currently the team concept is in its infancy "and transition has been difficult, but it's been working," said Mike Broll. For example, there is the quality assurance team which as a group decides whether a product is acceptable. Employees must be trained to interact in these group decision-making settings. They are given the techniques to make decisions as a group and how to evaluate performance. There are 30 teams in Murphysboro comprising ten to 20 members. Each team interviews from a pool to hire or replace members.

"Line workers and all employees are being trained in communication skills, both verbal and written," said

A skinny pig is good news

Labor is a four letter word at Quaker Oats Co.'s Golden Grain facility in Seattle, WA because production and warehouse employees are part of the same team. Management sees itself as a coach, said Vicki Rosellini of human resources, after she corrected *FE* from using the "L" word to refer to hourly employees as labor.

Golden Grain has a unique three-part compensation program in place as of February 1, 1991, in which employees may volunteer to participate. Approximately 65 out of 86 employees are engaged in the *Pay for Knowledge* training program which rewards individual initiative and gains in skill. Twenty-four percent of the participants have been promoted to higher paying positions as a result of the program.

Pay for Knowledge includes on-the-job training (OJT), outside classroom time, testing and certification (where applicable). Jody Maxson is a maintenance technician who recently completed his associates degree in electricity under the program. He is presently at Level 3 (out of four levels) and is working towards his boilers' license. "As an employee, you feel better about yourself having a direction and knowing where you're going," Maxson said. Overall, he is satisfied with Pay for Knowledge, but he expressed impatience with the additional time the advanced stages of the program demand. Earlier, he had only to demonstrate proficiency, but at this point he must go to school. However, he acknowledges education is critical to his professional growth.

"People are very enthusiastic about the program," said Parmjit Khaira, a 13 year veteran of the processing department, who is now a trainer.

Share the Success is the second part of the compensation program and it rewards group efforts to save money. "It makes us aware of waste and encourages us to cut down on it," said Khaira. Each month a particular area is chosen and a goal is established, for instance a goal could be established to cut down on flour waste. Twice a year, employees share in the profits if goals are met, with rewards reaching $1000.

What happens if the goal is not realized? Rather than show disappointment, Rosellini said, "People just committed themselves to not letting it happen again." Maxson agreed, adding, "No one comes down on you. We take the good with the bad."

Visual aids keep employees abreast of their collective efforts toward eliminating waste. "No one really reads the multitude of charts and graphs in company literature," said Rosellini, "so we keep it simple with pictures which represent company progress. A fat pig means we're wasting a lot." And a skinny pig is good news.

The third part of the program builds corporate awareness. The *Operating Income Multiplier* rewards employees if corporate performance beats the goal.

All three programs have boosted morale tremendously and opened up avenues of communication, according to all three Golden Grain employees. Rosellini added that the program is an ongoing process that must continually be nurtured.

Golden Grain's Jim McConnaughay. "Line workers are being trained to make presentations, interact, persuade, represent their group, influence others, and articulate themselves. For many, this is the first time they've done anything like this. People are being trained to be cross-functional: not just in processing, but in processing and packaging. Skill sets are being expanded."

The team concept has bloomed beautifully at Campbell's Maxton, NC plant which makes its cans as well as fills them with soup. Implementation of a worker safety program in the can manufacturing department reduced injuries and employee turnover, and improved morale, said Daryl Clayton, container manager. By giving employees more responsibility plus the tools and training to do the job, a dramatic turnaround occurred. Employee turnover dropped to three percent and injuries dropped 55 percent, Clayton said.

As part of the program, line workers made presentations on 200 safety topics and learned how to use safety equipment, (such as earplugs, fire extinguishers). They have also been cross-trained on other types of canning equipment.

Like other Campbell employees, Maxton employees can volunteer to be on a quality circle that chooses problems to solve; or be assigned to a task force that disbands after solving a management-assigned problem; or be a member of the still experimental team concept. The eventual goal of the teams is to be self-directed.

Stress of change

Once employees become more involved in their jobs, they generally like it. However, the transition itself can be stressful. The old idea that the supervisor solves all the problems is comforting and difficult to surrender. Workers can be stressed by the authority given them to shut off a line and they worry whether they can succeed at new tasks, said McConnaughay. Sometimes, workers set in traditional worker-management roles resist change. In these cases, peer pressure can encourage the old timers to change. Occasionally, a stubborn worker will either wait for retirement or become obsolete.

Open communication can reduce much of the stress, according to McConnaughay. Many managers interviewed by *FE* said it is imperative to involve employees at the very beginning of changes to give them an element of control. If they are in on the process from the beginning, employees will have a sense of ownership in a new program. Successful managers know that taking the time to communicate with employees will facilitate the success of a new program. Ore-Ida's Jerry York welcomes employee questioning of management, saying, "it shows that they care." Although there are some old school managers that still expect employees to check their brain at the door, they are very much in a diminishing minority. Companies interested in implementing these changes in management will realize success by remembering as York simply said, that "people like to be in on what's going on." ▲

Characteristics of Today's and Tomorrow's Workplace

Traditional Model	High Performance Model
Strategy	
Mass production	Flexible production
Centralized control	Decentralized control
Production	
End of line quality control	On-line quality assurance
Fragmented tasks	Work teams, multi-skilled workers
Authority vested in supervisor	Authority delegated to worker
Hiring	
Labor-management confrontation	Labor-management cooperation
Minimal qualifications accepted	Screening for basic skills
Workers seen as a cost	Workforce seen as investment
Job Ladders	
Internal labor market	Limited internal labor market
Advancement by seniority	Advancement by certified skills
Training	
Minimal for line workers	Training for everyone
Specialized for craft workers	Broader skills sought

Source: "Competing in the New International Economy." Washington: Office of Technology Assessment, 1990.

Numbers of Food Workers in the U.S. (1987)

Dehydrated fruit, vegetable, soup
10,100 employees
132 plants
$11.9 billion in shipments

Canned foods
65,100 employees
647 plants
$12.2 billion in shipments

Frozen foods
49,800 employees
258 plants
$6.6 billion in shipments

Pickles, sauces, salad dressing
21,400 employees
382 plants
$5.5 billion in shipments

Total:
146,400 workers
1,419 plants
$36.2 billion in shipments

Source: 1987 Census of Manufacturers, Bureau of the Census.

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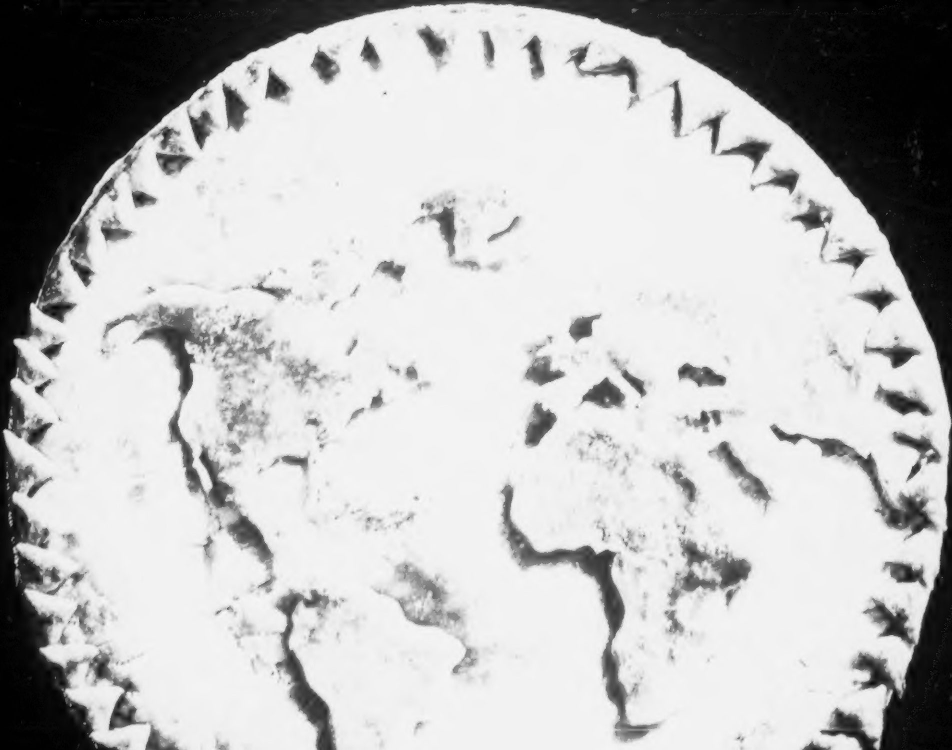
FOOD ENGINEERING

SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

WORLDWIDE NEW PRODUCTS ANALYSIS



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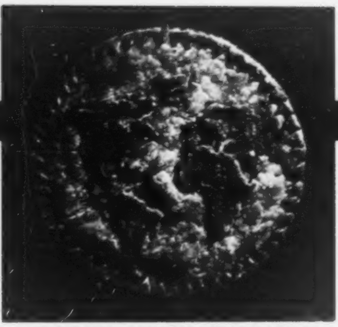

ABOUT THE COVER

No longer a pie in the sky, a global food industry is becoming a reality. Within the global village, new products increasingly are featuring less and less: less fat, cholesterol, salt, calories and sugar.

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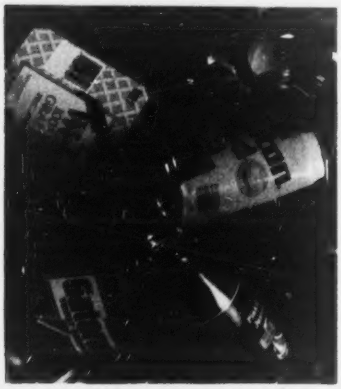

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JESSE H. NEAL
AWARD-WINNING
EDITORS

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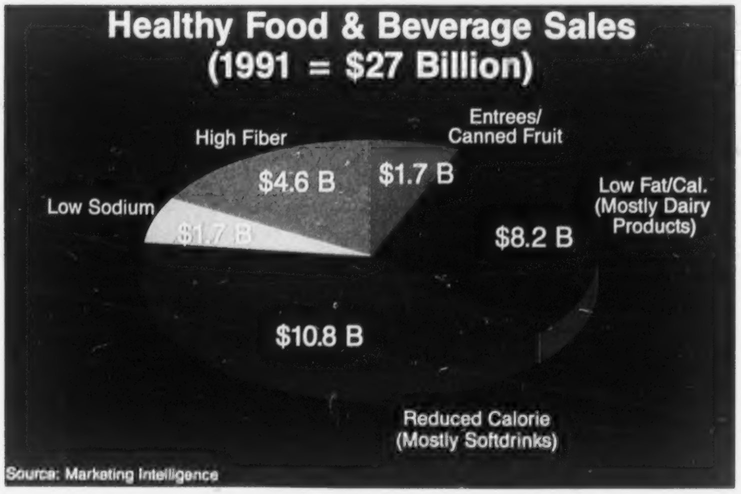
CHARLES E. MORRIS
MIDWEST EDITOR

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

NEW PRODUCT ANALYSIS

This is the year that *FE* goes global in our new product analysis. Worldwide introductions have been innovative, concerned with calories, and sometimes strange by Western standards. But first, a look at the U.S. where new launches have adopted the theme that "less is more" as more and more introductions feature less and less fat, cholesterol, salt, calories and sugar. Total products sporting no/low salt, sugar, cholesterol, fat, low calorie or high fiber increased from 1990's 31.8 percent to 33.3 percent, according to Marketing Intelligence Service, Ltd., Naples, NY. The most dramatic gain was made by no/low fat claims, which increased from 13.8 percent in 1990 to 17.5 percent in 1991.

In last year's very "healthy" marketplace, ConAgra went ballistic when it expanded its *Healthy Choice* name into everything from soup to desserts and virtually everyone else in the field tried to play catch up, said Colleen Galbraith of the North American New Product Report, Valley Forge, PA. ConAgra rolled out lowfat *Healthy Choice Meals* in cans and microwave cups, "hearty and homestyle" *Healthy Choice Soup*, *Healthy Choice Frozen Dairy Dessert*, and its lowfat and cholesterol-free *Healthy Choice Spaghetti Sauce*. Competitors have realized that virtually no area of the supermarket is safe from the Omaha, NE giant.



Source: Marketing Intelligence

Rival Campbell Soup outmaneuvered ConAgra in the frozen seafood category by introducing *Mrs. Paul's Healthy Treasures* 97 percent fat-free fish sticks and fillets. Based on proprietary technology that took five years in the making, the new recipe tastes like fried fish. Campbell also dug into the trenches by reformulating its *LeMenu LightStyle* to contain fewer calories, cholesterol and sodium and renaming it *LeMenu Healthy*, said Galbraith.

Other competitors also anticipated ConAgra's foray into their territory. Heinz's Weight Watchers spent $1 million to develop its *Weight Watchers Ultimate 200* to conform to a 200 calorie profile, according to Galbraith. "As it turns out, only two of the 11 items are really new (a grilled chicken sandwich and a ham & cheese pocket sandwich)," she said. The average of the nine entrees contains 14 percent less fat, 19 percent less cholesterol and 20 percent less sodium, she added.

Another trooper that has stormed the light market is SlimFast Foods with its blitzkrieg of coupons appearing in Sunday newspapers throughout the country announcing its line of diet foods. *Ultra SlimFast* rolled out shelf stable entrees, microwaveable pasta, *Frozen Delight* novelty bars, sandwiches, snack bars, popcorn, pretzels, cheese curls, instant soup, pudding and hot cocoa.

The explosion of "lite" consciousness even went so far as to prompt introduction of a light *Milky Way* bar from M&M/Mars. Featuring 25 percent fewer calories, *Milky Way II* received high marks from members of the *FE* staff.

Regarding ubiquitous regulatory issues, it will be interesting to see how the Food and Drug Administration's (FDA) recent crackdown will affect new products making heart-related health claims. The FDA has objected to Clorox Co.'s *Hidden Valley*

Ranch Take Heart salad dressing regarding the use of the word "heart" in the branding and labeling. The agency also objected to the fat-free tag because the salad dressing is formulated with partically-hydrogenated soybean oil which is 100 percent fat. As of *FE* press time, discussions between Clorox and the FDA were still underway. The FDA's action apparently hasn't discouraged other companies from marketing heart-based products. John E. Cain Co., Ayer, MA has marketed *Cains Light Hearted Reduced Calorie* dressing, which is labeled saturated fat-free and cholesterol-free.

In addition to the healthy trend, consumers are showing a marked preference for hot and spicy foods, according to Robert McMath, director of The New Products Showcase & Learning Center, Ithaca, NY. The American Spice Trade Association attributes this trend to the increased use of spices as an alternative to salt. Dehydrated onion and garlic are the most popular spices, with pepper coming in a close third, the association reported. Increased spice consumption is also whetted by Americans' appetite for spicy ethnic dishes, such as Szechuan, Thai, Mexican and Caribbean foods

Elsewhere on the new product front, the recession had a slight dampening effect on new food introductions but apparently failed to stifle beverage introductions. New food intros in 1991 (excluding health and beauty aids, household, pet and other products) totaled 3,148 (8,061 SKUs, which includes all sizes, flavors and varieties of a given product), down from 1990's 3,489 (9,020 SKUs), according to Marketing Intelligence. Beverage intros dropped from 1990's 642 (1,621 SKUs) to 597 (1,805 SKUs) in 1991. Much of the growth occurring within the beverage segment came from line extensions, rather than new brands.

The largest companies are making a comeback. The largest companies are taking a greater leadership role in new product introductions, with the top ten marketers accounting for one out of eight new products in 1991, up from one out of ten in 1990, according to Marketing Intelligence.

Future New Food Product Trends

1. **Whole Grain Food Products** continue to make inroads into the supermarket, a most recent example is brown rice.
2. **Beta Carotene** will be increasingly promoted on the label.
3. **Second Generation Soy and Textured Vegetable Protein (TVP) Products** will be used in more hot dogs, lunch meats, and burgers. Flavored tofu and soy beverages are beginning to enter the supermarket.
4. **Spring Water as an Ingredient** is best demonstrated by Celestial Seasoning's use of Poland Springs or Calistoga brand water in its line of ready-to-drink tea.
5. **Store Brands** will blossom, i.e., Super Fresh's Master Choice brand.
6. **Recycled Packaging** use and smarter use of packaging will escalate.
7. **Organic Food** growth will be fueled by consumers' environmental concerns, especially for ground water.
8. **Socially-responsible Marketing** will continue to be popular, i.e., Ben & Jerry's 1% for Peace ice cream.
9. **Aquaculture-raised Fish** will appear in-store as a result of demand and new technology.
10. **Herbs and Garlic** will increasingly be used in medicinal foods, i.e., herbal teas and herbal soups.

Source: Starr Track Strategic Marketing.

Introductions in 1991 from the top companies include, (with 1990 figures in parenthesis): Philip Morris Cos., 288 (275); Procter & Gamble Co., 279 (226); ConAgra, Inc., 183; Grand Metropolitan, 166 (84); Campbell Soup Co., 134 (93); Nestle, 134; General Mills, 86; H.J. Heinz, 96; Quaker Oats, 94 and Ralston Purina, 92. "These companies are thinking longer term," said Richard Lawrence, president of Marketing Intelligence. "They expect to emerge in a stronger position than others, especially second and third tier competitors, whose weaker market positions have forced them to cut back investment in fundamental business building."

Another notable trend is the increase of "green marketing" with the amount of new products making environmental claims reaching an all-time high of 13.4 percent in 1991, up from 11.4 percent in 1990, according to Marketing Intelligence.

1991 New Product Introductions

	Number of products	% Change from 1990
Food	8,061	-10.6
Beverages	1,805	+11.4
Total	9,866	+0.8

Source: Marketing Intelligence.

What's on the horizon for '92? Marketing Intelligence expects no more than small growth in new products. "The development cycle for new products is several months, so any rebound in the economy after midyear will have little effect on new products in 1992," said Lawrence. "In addition, more restrictive labeling regulations are likely to dampen, rather than accelerate new food and beverage introductions which have thrived in recent years on a free-wheeling climate for 'better-for-you' nutritional claims," he added.

GLOBAL NEW PRODUCTS

Looking worldwide, new product introductions in 1991 have been innovative, concerned with calories or unusual, at least by traditional U.S. standards. First, a look at the most innovative products:

P&T Foods N.V., Hulshout, Belgium, added two more products to its world's first microwave-sterilized shelf-stable meals: *Tagliatelli* with smoked salmon chunks in Bechamel sauce and *Tortellini* filled with Ricotta and Parmesan cheeses and ham in Bechamel sauce. Named *Top Cuisine*, the shelf-stable meals have just expanded distribution from much of Western Europe to Australia.

The pasta dishes combine modified-atmosphere (MAP) packaging in barrier-plastic containers with microwave sterilization to achieve a non-refrigerated shelf life of nine to 12 months. Consumers can either pop the product into a microwave oven or into boiling water.

Microwave ovens continue to infiltrate Europe and Japan. Some 65 percent of British households own microwave ovens, fast approaching the U.S. rate of 82 percent. A parallel development has been the tendency of British family members to eat at least one meal alone, kindling demand for single-serve microwaveable meals. Among those making microwaveable/dual ovenable introductions was Heinz, which added three varieties to its *Lunchbowl* microwaveable, shelf-stable snack meals.

The logo is the same, but the label tells it all. U.S. food and beverages are increasingly going global.

[redacted]

Meat pastry products, referred to as pasties, are popular snack meals in the U.K. However in the past, microwave ovens failed to brown the product. Several companies have solved the problem, notably Tiffany Sharwood in the U.K. The company introduced a range of single-serve frozen puff pastry pies whose susceptor panel allows the pie to brown.

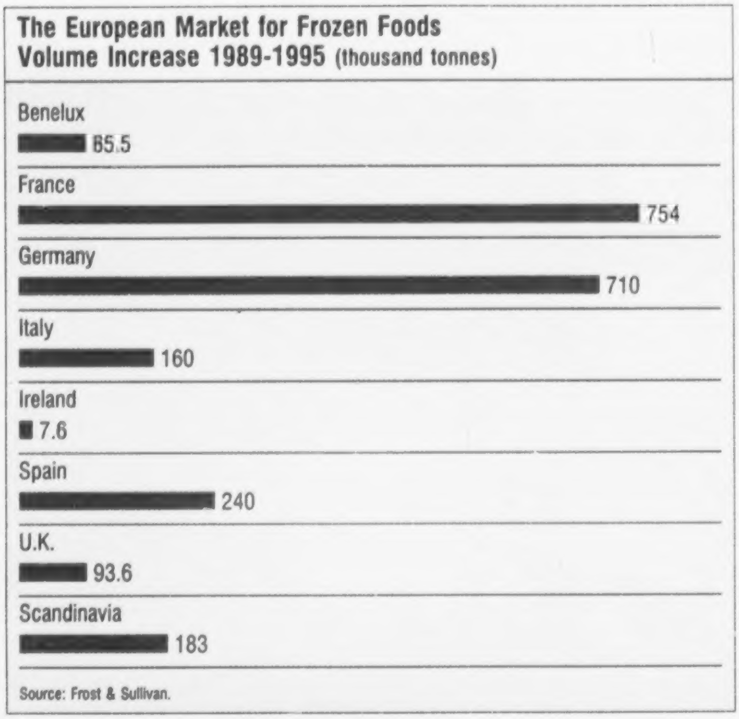
Quiche varieties of pasties are more popular on the continent. Roger de Lyon added three varieties to its savory pasty line: salmon, snail and salmon & dill quiche. And French company Elkagel introduced frozen *Samossas* in Denmark, crunchy triangular-shaped pasties containing lamb and pork with Indian spices.

Microwave oven ownership in France is still relatively low, 23 percent. French families still tend to eat together, spurring the 110 percent growth in frozen entrees in family-sized dishes. For example, Vivagel produces a line called *Les Plats Cuisinees Familaux*, in family-sized portions.

Another noteworthy trend is that more Britons are becoming vegetarian—a total of six million. This trend has fired up vegetarian product sales by 49 percent. Vegetarian entrees are usually based either purely on vegetables or have added meat alternatives, such as soy protein or tofu. However, in the late 1980s, a totally new meat alternative was introduced—Quorn. It took 20 years to develop Quorn from a myco-protein derived from a distant relative of the mushroom. Quorn has a mild taste, is low in fat and calories, high in fiber and can be produced in different textures to suit the applications. A recent Quorn launch was *Quorn and Vegetable Crispbakes* from Dalepak Foods.

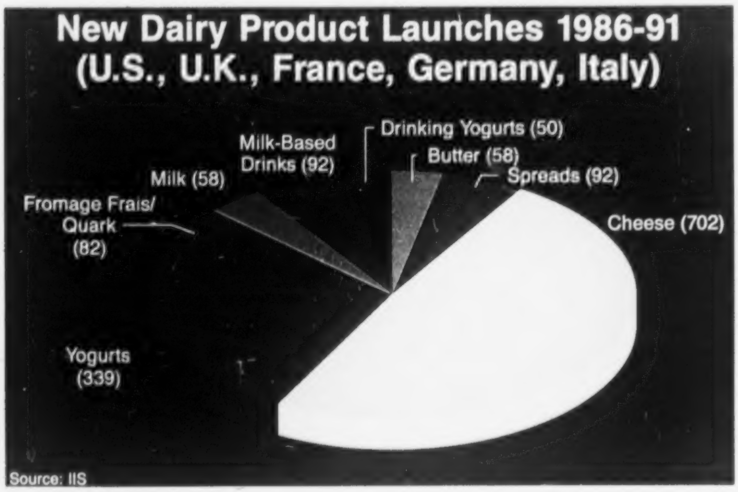
In addition, Europeans are demanding more natural and additive-free foods. Frost & Sullivan International, London, reports increased requests for organically-grown produce, organic meat and free-range poultry—in the frozen meals section. While Americans have often been told that refrigerators are not as common in Europe as in the U.S., frozen food consumption statistics in Western Europe are reversing this perception. Frozen food consumption in Western Europe is expected to increase from 1990's 6.87 million tonnes to over 9.1 million tonnes by 1995, according to Frost & Sullivan.

London-based IIS, Ltd. reinforces



The European Market for Frozen Foods Volume Increase 1989-1995 (thousand tonnes)

Source: Frost & Sullivan.



New Dairy Product Launches 1986-91 (U.S., U.K., France, Germany, Italy)

Source: IIS

optimism in the frozen market by forecasting continuing boyancy in the frozen ready-to-eat (RTE) meal market. This will be especially true for countries with high microwave ownership. In light of the U.K.'s salmonella scare, frozen foods are perceived as being safe, perhaps helping to fuel a 45 percent increase in new product intros for the category from 1986-1991, according to IIS. Close to 75 percent of convenience foods were RTE, chilled frozen, and canned meals, according to IIS.

Projected as the high performers in the frozen case: potato products, expected to grow by 635,800 tonnes by 1995; RTE meals, to grow by 598,600 tonnes; and vegetables and fruit, expected to increase by 439,700 tonnes, according to Frost & Sullivan.

Pasta and rice comprise many of the RTE meals—both frozen and shelf stable. Nestle-Findus, Finland, introduced *Cannelloni* frozen pasta meals while Frozen tortellini with cheese and ham sauce debuted from *Dagens Ratt* brand in Sweden. Meanwhile a dry pasta with sauce kit was introduced by Bernbacher, Germany.

Milk this cow

Cheese accounts for close to half the Western European introductions, and yogurt, nearly a quarter. As in the U.S, the trend toward healthy eating has modified the fat, additives and flavoring used in cheese products.

Cheese is considered a staple in Germany and is often consumed at breakfast. Low and reduced-fat cheese introductions were common. Mini portions are favored for packed lunches and many cheeses feature added herbs, spices and flavors. Germany's Bridel introduced *Le Carre Leicht*, a low-fat soft French cheese with 12 percent fat content. And who could resist at least trying *Cheesey Wheesey* cheese spread that St. Ivel added to its *Fiendish Feet* line. The Swiss-based cheese maker packages its cheese and yogurts in lidded containers with a ghoulish face mounted on plastic feet. Nestle's *Lunebest* brand launched the first yogurt-based bread spread: *Pikanter Joghurt Aufs Brot*.

Meanwhile a new twist in an old product has been introduced by Long Clawson Dairy, U.K. *Blue Vinney* is a low-fat cheese made from skimmed milk and has blue veining throughout. First introduced in the 18th century, it suits today's health conscious consumer. And from a country that prides itself on its traditional cheese, the French company Val d'Ancenis launched a low-fat cream cheese called *Vivez Leger* with added vitamins.

Other low-fat products introduced: *Vivez Leger* low-fat butter in France; a butter-based spread with 50 percent less fat in Italy called *Burro;* Birds Eye Wall's light ice cream in the U.K.; Smith's *Less Oil Potato Crisps* in Australia and a low-fat frankfurter from Prima Meat Packers in Japan called *Pork & Beef Frank.*

The latest healthy eating wave in Europe that may arrive in the U.S. sometime in the future is fromage frais and quark. Outside of the U.K., fromage frais is eaten as a savory cheese, while Brits favor it only as a dessert. Quark is a spread that is wolfed down by Germans for breakfast.

Ehrmann, Germany added three varieties to its *Monster Backe* line of quark desserts: pineapple & apple; peach & pear and raspberry & loganberry. German dairy company Borgmann and Cool Country launched *Chocolate Tops* fromage fraise and live yogurt dairy desserts on a layer of fruit with milk chocolate chips. Meanwhile, still a newer product has been introduced by French company Bongrain: a milk snack called *Pikifou* to be marketed next to fromage and yogurt.

Dieting continues to be a preoccupation in most of the developed countries of the world and even in some of the less developed countries, such as Mexico and Brazil. *Weight Watcher* products have posted 17 percent growth in the U.K. More surprising, a low-calorie jelly mix has been introduced in Mexico. Arancia sweetens its *Gloria* jellies with *Nutrasweet* and varieties include: chocolate, lemon, strawberry, vanilla, pineapple, grape and orange. And light bread has arrived in Brazil with Falkenburg marketing it at 45-calories per slice.

The Japanese rival the U.S. in number of new product launches—4,000, with an estimated 99 percent failure rate! A strange quirk among Japanese consumers is the tendency towards relatively short-lived flavor fashions. In 1990, peach was in vogue, last year it was banana.

Japanese foods and beverages are often tailored for specific health needs and some products are just plain outrageous! Considering a career in the opera? Take a gulp of *Karaoke Nodo Jiman Drink Jelly* that was designed to soothe the throat to improve the voice for singing or speaking engagements. FDA's David Kessler would have to change his name to Rambo and hire a commando team to review many of the claims made by Japanese marketers. Pokka Corp. gives new meaning to the term surgical marketing when it segments the market by blood type. *Ko-Tsukau* soda is a lemon-flavored drink rich in calcium and vitamin C aimed specifically at consumers with Type A blood while *Joni-Atsui* soda is apple-flavored and contains Vitamins C, B1, B2 and B6 for those with Type O blood.

Other functional products include: *Aqualagen*, a cosmetic drink which manufacturer Naris Cosmetics claims beautifies the skin. *After Alcohol* is a concentrated mineral water that prevents hangovers after a night of heavy drinking. And *Pana Green* from Wako Angel Green uses the leaves of young carrots to eliminate bad breath.

The Japanese aren't the only ones with a unique perspective. European confectioners swerve hard away from healthy foods with entries such as: *Danish Dog Droppings* hard licorice from Fridam in Holland. A truly appetizing treat sure to delight children is Denmark's Bon Bon Co.'s *Skid Marks, Rotten Fish, Earwax, Dead Flies, Drain Slime* and *Seagull Dung.* Yum. Whether the trend is healthy or just plain funky, worldwide food trends give us a feel for what's coming next for us. Whether we swap sophisticated technology, preferences to eat healthy, or marketing plans that include cultural icons such as *Teenage Mutant Ninja Turtles*, U.S., European and Asian food manufacturers have a lot to offer each other. Pay attention, some day you could be eating quark for breakfast and washing it down with After Alcohol.

BEVERAGES

Meanwhile, back in the U.S.A., beverage introductions reached 1,805, (total SKUs) an increase of 11.4 percent—a dramatic performance compared to the 10.6 percent drop food introductions experienced, down to 8,061 in 1991, (total SKUs) according to Marketing Intelligence. Areas vying for top number of new beverage product introductions in 1991 include fruit and fruit-flavored drinks, coffee and tea (see New Beverage Offerings chart). Bottled water also displayed respectable gains, along with soft drinks. The demand for perceived natural and pure products spurred Pepsi to formulate a clear cola.

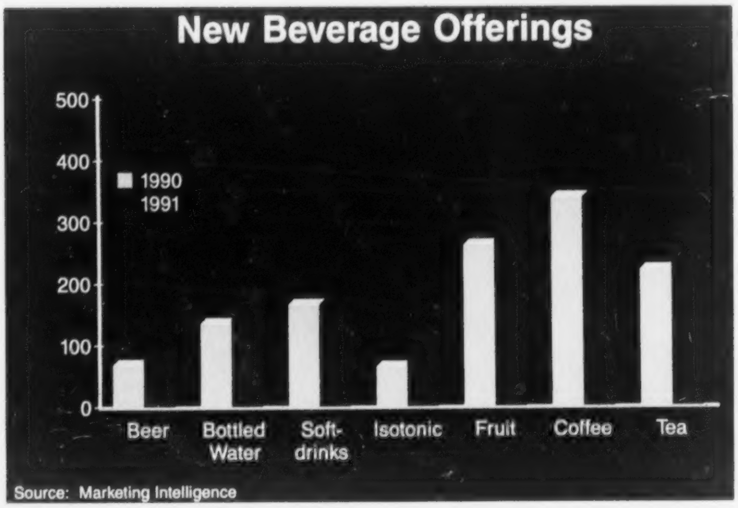
Meanwhile, consumer health consciousness kindled renewed growth in fruit beverages, with regional bottlers rolling out new exotic flavors and flavor blends.

- After the Fall Products, Inc., Brattleboro, VT added melon and raspberry flavors to its line.
- Snapple added kiwi-strawberry and pink lemonade to its line.
- Nabisco Brands, Ontario, rolled out *Del Monte* apple raspberry, mandarin orange, pink grapefruit and pineapple orange *Passion Fruit Juice Coolers* with 25 percent juice.
- Ocean Spray is marketing its new *Orange Juice Cocktail* through vending machines that positions OJ as being an all-day drink rather than a breakfast juice.
- Pear juice is rivaling apple juice

NEW PRODUCT ANALYSIS

as a favorite of the diaper set as H.J. Heinz Co. launched a pear grape juice for babies. White grape juice was also introduced as a non-staining variation of a classic.

- SlimFast Foods Co. tapped fiber-enriched non-carbonated juice drinks.
- South Africa's *Ceres* brand imported by S.A. International, Inc., Brooklyn, NY unveiled granadilla, guava, grapefruit, litchi, mango, orange, peach, pear, pineapple, strawberry, tangerine, red grape, apple & blackcurrant, mango & orange, peach & banana, pineapple & mango fruit juices and juice blends.
- Papaya lime banana is a 100 percent juice blend offered by Excello Wagner Food Products, Inc., Schiller, Park, IL.



Source: Marketing Intelligence

Ready-to-drink iced coffees and teas revived the category that had been flat for several years. Most of the offerings are from regional companies, however, beverage giants are beginning to smell the coffee and have global marketing ambitions. Coke and Nestlé announced their joint venture in October to sell Nescafé *Canned Coffee*. For the rollout, Coca-Cola Nestlé has placed 2,700 vending machines in Seoul. "Korea is going to be a role model for the rest of the world as far as hot and cold (coffee) vending," according to Larry Teague, the former Coke executive who will head up the joint venture's Korean operation. Stores that sell the Nestlé product will be equipped with warming boxes on store counters which enable the canned product to be purchased hot. South Korea is regarded as a prime test market because canned coffee penetration is a relatively low three percent, compared to Japan's 20 percent.

In December, Pepsi announced plans to join forces with Thomas J. Lipton Co. to create new tea beverages and sell Lipton's existing ready-to-drink teas through Pepsi's distribution system. Pepsi dismisses the possibility of that iced teas might cannibalize its cola brands since tea drinkers tend to be older than soft drink consumers.

Both Coke's and Pepsi's move into the iced coffee and tea markets have been interpreted by industry observers as a response to the softening soft drink market. Both the Pepsi and Coke generation is getting older and both conglomerates must be creative in reaching their aging consumers.

New mineral and bottled water introductions have overflowed the beverage market. Parents worried about the quality of their tap water now can get junior started right with Beech-Nut's *Baby First Spring Water*—bottled water for infants that is fortified with fluoride and packaged in "nipple-ready" bottles. Many of the regional spring water sellers seek the pure and natural niche while offering exotic flavors, such as lemon-ginger, kiwi-lime, raspberry guave & apple, orange mango, raspberry vanilla, to name just a very few. Also, water from everywhere else appears to be in, with many new intros from exotic locales, such as France, Australia, Canada, Scotland, Niagara Falls, NY and Brooklyn. And finally: Taking the concept of ice water literally, Canadian businessman Ron Stamp will bottle water from North Atlantic icebergs and market it as *Canada Ice Water*.

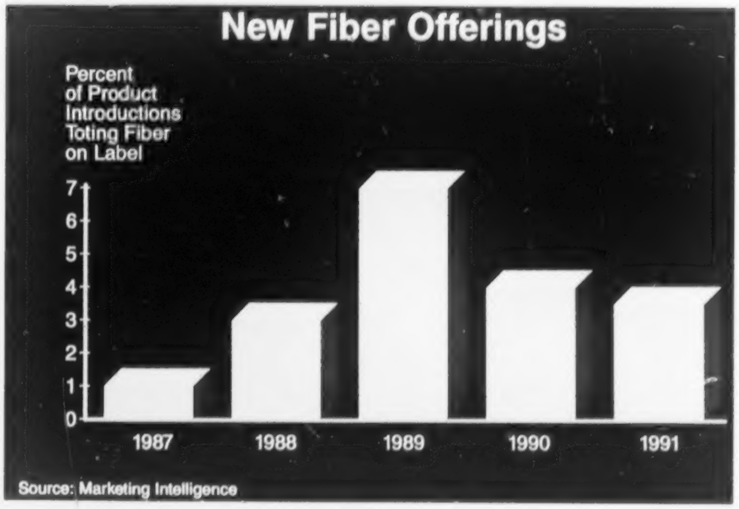
CEREAL

Cereal introductions were subdued last year compared to 1989 and 1990, the golden age for fiber. New RTE cereal introductions dropped from 1990's 31 (151 SKUs) to 23 (122 SKUs) in 1991. While the emphasis on fiber appears to have stabilized as market observers predicted, (see New Fiber Offerings chart), cereal marketers now promote their products based on a variety of grains, rather than one magic elixir as oat bran had been advertised a couple of years ago. However, fiber may have another shot at the limelight as a fat substitute for meat products.

While "natural goodness of whole grains," has been a familiar tagline on many adult cereal launches, Kellogg Co. has raised the ante by introducing *Low-Fat Granola with Raisins*. It is made from whole grain oats, wheat, rice, almonds, and raisins. It features half the fat of Quaker's *100% Natural Cereal*. Quaker is meeting the challenge with a low-fat version of its granola cereal. While granola has been on the market for a while, commercial varieties have had high levels of fat and low-fat varieties should attract consumers seeking both a natural and low-fat fix. Meanwhile, natural continues to sell:

- *Granny Blossom's Original Granola* and *Original Granola with Fruit* from Blossom's Corner, Wells, VT offers more nuts and seeds than other granolas.
- Low-fat shredded wheat that is advertised as being minimally processed is available from Barbara's line of cereals.
- Finally, could the mood food trend be coming true? Tony Adams of Campbell Soup and Linda Gilbert of HealthFocus, Emmaus, PA have predicted that consumers will soon be buying foods to get into the mood for romance, relaxation or to boost their energy. Shamrock Foods Exports Ltd., Winthrop, MS markets its *Shamrock Muesli Wheat & Bran with Fruit and Nuts* cereal as "nutritious, satisfying and calming."

And finally, the latest licensed character introduction from Ralston-Purina departed from the movies to bring us *Urkel-Os* cereal, based on the nerdy Steve Urkel from television's *Family Matters*.



Source: Marketing Intelligence

CONVENIENCE MEALS/ENTREES

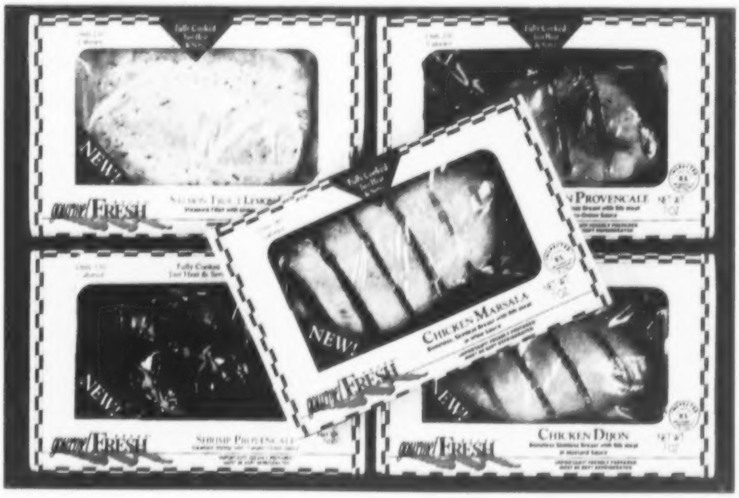
Although the total number of new food products introduced during 1991 slipped nearly 10 percent as compared to 1990, the number of new entries in the meal/entree category was remarkably consistent with the preceding year. As shown, 473 new meal/entree products (1,104 SKUs) were launched during 1991, just six shy of the 479 (1,189 SKUs) rolled-out the preceding year. More than 40 percent (198) were tagged "microwaveable." More than one-third (158) carried one or more health claims such as "low fat" (90), no additives/ preservatives/MSG (74), no/low cholesterol (69), low calorie (66) and low salt/sodium (47).

Frozen: Major processors introduced low-fat/low-calorie lines or reformulated existing lines. Examples: *Tyson Low Fat Chicken Dinners* ranging from 220 to 240 calories each; Weight Watchers *Ultimate 2000* entrees, including London Broil, Veal Parmigiana and Glazed Chicken, all under 200 calories; the *Ultra Slim-Fast* line of 18 poultry, pasta and meat-based entrees from ConAgra (licensed by Slim-Fast Foods) ranging from 230 to 400 calories each. All American Gourmet (Kraft General Foods) launched *Budget Gourmet Hot Lunch*, a line of 13 microwaveable low-cal "downsized entrees" aimed at office workers and promoted with free insulated lunch bags. Campbell repositioned it's *Le Menu* dinners to *Le Menu Healthy*, each under 300 calories, and restaged its *Harvest Grain* breakfasts as *Swanson Great Starts Healthy Breakfasts*, replacing (for example) light sausage links with turkey sausage in French toast/pancake

New Meal/Entree Products, 1990-91
(Fresh, Frozen & Shelf-Stable)

	1991		1990	
	No.	SKUs	No.	SKUs
Entree mixes	13	26	13	37
Meals & entrees	167	425	157	367
Meat meals & entrees	88	194	81	159
Fish meals & entrees	19	33	22	56
Poultry meals & entrees	82	163	77	146
Vegetable meals & entrees	24	61	6	39
Pasta products & combos	46	135	70	262
Prepared salads	12	28	13	51
Rice & rice combos	22	39	40	72
Total:	**473**	**1,104**	**479**	**1,189**

Source: Marketing Intelligence Service, Ltd.



***Sous vide* entrees from GourmetFresh Foods feature 21-day shelf life at 35°F and are distributed from Florida to New York and Chicago.**

products to lower fat calories below 30 percent. Stouffer Foods (Nestlé) reformulated its 34-entree *Lean Cuisine* line to under 300 calories each, with 30 percent or fewer calories from fat and at least 95-percent fat-free. ConAgra added *Quick & Delicious* entrees such as Beef Stew and Creamy Chicken with Pasta to its *Healthy Choice* lineup, unveiled six *Healthy Choice Breakfast* English-muffin sandwiches, introduced eight budget-priced *Banquet Healthy Balance* dinners under 300 calories each, and reintroduced *Banquet Entree Express* as "the first frozen entrees for the smaller-sized family." Pillsbury (Grand Metropolitan) launched *Pappalo's* 92-percent fat-free pizza; Tombstone (KGF) introduced *Tombstone Light* 90-percent fat-free pizza. Both feature real cheese and lean meats.

Refrigerated: Most significant new entry: The *GourmetFresh* line of *sous vide* poultry, pork and seafood entrees from GourmetFresh Foods in Pompano Beach, FL. Entrees range from 130 to 230 calories each, feature 21-day shelf life at 35°F, a custom-designed *Lifelines* time/temperature indicator on each package, and are distributed as far north as New York and Chicago.

Crystal Farms introduced *Microwave Omlettes* to Minnesota markets. Carnation (Nestlé) rolled-out MAP-packaged *Contadina Fresh* pizza kits with crust, cheeses (Mozzarella, Provolone and Romano) and sauce separately packaged in the same carton, and toppings (such as Italian Sausage and Pepperoni) available separately. Pillsbury launched *Green Giant Freshtables*—fresh vegetable salads such as Oriental Stir Fry, Tortellini Primivera and Vegetables Rotini with Cheddar Sauce—in Minnesota.

Shelf-stable: Dial (*Lunchbucket*) and Hormel (*Health Selections*) added microwaveable low-fat/low-calorie entrees in retortable plastic cups; Carnation launched *Libby's Diner* pasta entrees in a similar cup; Dial and American Home Foods (*Chef Boyardee*) added adult-sized entrees in larger cups. Hormel extended its *Dinty Moore* line of microwaveable entrees in retortable plastic trays; Del Monte extended its *Vegetable Classics* line with *Pasta Classics* in similar containers. Hunt-Wesson (ConAgra) test-marketed *Hunt's Homestyle Meals* (such as Beef Ravioli) in 42-oz. *BiPak* cans, and S&W launched *Deli Classics Pasta Salad* in 16-oz. jars.

Circle 48 on Inquiry Card →

NEW PRODUCT ANALYSIS

BAKERY

Bakery products introduced in 1991 totaled 498 (1,343 SKUs), down 14 percent from the 577 (1,382 SKUs) launched in 1990. Breakdown: Bread and bread products, 121; cookies, 167; crackers, 44; pastries and sweet goods, 86; cake and frosting mixes, 29; all other baking mixes, 51. More than half (258) trumpeted health claims; most of these bore multiple claims like those tabled. Most misleading: a few products containing chocolate or chocolate chips and labeled "no tropical oils." Significant introductions:

Bread: Surprisingly, the 40 calorie-per-slice "lite bread" craze of 1989-90 faded in '91. But the 1990 introduction of *Ironkids Bread* by Anheuser-Busch bakeries (Campbell! Taggert, Rainbo, Colonial) sparked similar white breads with the fiber content of whole-wheat bread and aimed at youngsters. Examples: *Holsum Olympic Kids* (Metz), *Smart Kids* (Schwebel), *Kids' Choice* (Nickles). ConAgra extended its *Healthy Choice* brand into low-fat frozen muffins; Pillsbury (Grand Met) added lowfat *Hearty Grains Biscuits* to its refrigerated dough line; Sara Lee launched *Deli Style Bagels* in six varieties.

Cookies & crackers: Weight Watchers (Heinz) introduced several varieties of low-fat *Soft And Chewy* cookies. Pepperidge Farm (Campbell) unveiled several flavors of *Wholesome Choice* cookies with less than 30 percent of calories derived from fat. *Prime Time America* fiber cookies, formulated by that firm to complement a systematic weight-loss program, absorb water to create a sense of "fullness" and also derive less than 30 percent of calories from fat. Half the profits from fructose-sweetened *Fifty 50* cookies go to diabetes research, says manufacturer Fifty 50 Foods.

Some new cracker varieties were positioned as snacks. Nabisco introduced bite-sized, Z-shaped *Zings Cracker Chips* in three flavors, made from dried potatoes and "baked, not fried, (so) you can feel good about eating them," and extended a popular brand with *Ritz Whole Wheat Crackers*. Frito-Lay test-marketed *Doritos Cracker Crisps* cracker chips.

Pastries: Eli's Chicago's Finest launched three varieties of 87-percent fat-free *E'Lites Frozen Cheesecake*, the first bakery product to incorporate NutraSweet Company's *Simplesse* fat substitute. The first bakery products bearing the *Ore-Ida* (Heinz) brand—a line of thaw-and-serve muffins, Danish, brownies, rolls, croissants and specialty cakes—was introduced by the company's Bavarian Specialty Foods unit. Entenmann's (Kraft General Foods), first with fat-free pastries in 1990, extended its line. Pillsbury launched 11 ready-to-eat, microwaveable *Bake Off Refrigerated Baked Goods* including brownies, muffins, Cinnamon Rolls and Bundt cakes. Kellogg teamed-up with J.M. Smucker by adding *Pop Tarts* containing Smucker fruit fillings. Another "double trademark" which makes no health claims: *Sweetery Desserts Milky Way Cake*, a nine-inch three-layer refrigerated cake containing 4½ melted Milky Way candy bars plus butter, caramel-glaze filling and chocolate pecan cream-cheese frosting, from Sweetery of Anderson.

Baking mixes: Several processors launched microwaveable mixes. Examples: *Betty Crocker* Blueberry Mini-Muffin Kit with recipe, two mixes and 12-cup microwaveable pan, and *Betty Crocker MicroRave Singles* cake and brownie mixes, from General Mills; *Duncan's Cups* Blueberry Crumbcake microwave mix, with eight baking cups and measuring cup. Most appealing new mix to a *Food Engineering* editor: *Beer Bread Mixes* "prepared by mixing 12 ounces of beer with the mix and baking in a loaf pan for 50 minutes," from Lollipop Tree, Inc.

'Healthy' Tags On New Bakery Products, 1991

No fat	20
Low fat	48
No/low saturated fat	24
No/low cholesterol	116
No tropical oils	37
Low calorie	44
No/low salt/sodium	60
No preservatives/additives/ 'artificial' ingredients/MSG	102
High fiber	37
'Natural'	87

Source: Marketing Intelligence Service Ltd.

Circle 49 or see FEM, p. 262 →

NEW PRODUCT ANALYSIS

DAIRY

Three cheesemakers rolled-out natural cheese varieties incorporating *Simplesse* to reduce fat by 50-70 percent and calories by 45 percent. Shown above: *White Clover* Cheddar, Colby, Muenster and Monterey Jack from White Clover Dairy; *Cabot* Sharp Vermont White and Yellow Cheddars, from Cabot Cooperative Creamery. Not shown: *Falbo-Lites* Mozzarella from Avonmore Cheese Co. (Source: NutraSweet Co.)

Dairy-product introductions plunged 22 percent last year, from 445 (1,296 SKUs) in 1990 to 346 (966 SKUs) in 1991. Breakdown: Milk & beverage, 30; cheese, 82; ice cream and frozen desserts, 147; margarine, butter and blends, 23; yogurt, 28; dairy substitutes, 14; milk additives, 2; other non-beverage dairy-case products, 20. Of these, 75 percent (259) bore health claims such as "non-fat," "low fat" and "low cholesterol." Products that can make a difference:

Milk: Country Lake Foods (a subsidiary of Land O'Lakes) and Schnuck's Markets (St. Louis) unveiled two percent lowfat milk with cholesterol reduced 70 percent (compared to regular two percent milk) through steam-stripping technology. Crowley Foods, Marigold Foods (*Kemps Free*) and Promark (*Weight Watchers*) all launched "non-fat milk." Dean Foods launched *Dairy Ease* lactose-reduced milk in skim, one and two percent lowfat varieties, all UHT-pasteurized to extend refrigerated shelf life. Aseptic pioneer Real Fresh introduced lowfat, two percent and whole milk in quart-size aseptic cartons to Arizona markets, while Milk Maid rolled-out four flavored whole milks plus a lowfat in half-pint aseptic three-packs in New Jersey. Chefs Cream unveiled spoonable "triple-thick" Light Cream (24 percent fat) with one-year shelf life.

Cheese: Only 22 reduced-fat cheese products of all types – natural, pasteurized process, cottage and spreads – were introduced last year as compared to 64 in 1990, reflecting the difficulty of replacing the taste and texture of fat in cheese, and consumer dissatisfaction with offerings to date. But NutraSweet Company's *Simplesse* might make a difference: Kaukauna Cheese unveiled four varieties of *Lite 50* cold-pack cheese spread, the first cheese products to incorporate Simplesse as a fat replacer. Simplesse 100, based on whey-protein concentrate (WPC), replaces the plastic cream used in the regular product to reduce fat by 50 percent and calories by 25 percent while maintaining spreadability. Before year's end, three more cheesemakers rolled-out natural cheeses incorporating Simplesse 100 (see photo). Kraft General Foods (KGF) extended its own fat-replacement technology by introducing *Fat-Free Philadelphia Cream Cheese* and *Light n' Lively Free* Nonfat Cottage Cheese.

Ice cream & frozen desserts: The 1990 avalanche of fat-free frozen desserts continued as 19 more appeared in '91. Example: NutraSweet's *Simple Pleasures Light*, combining the company's Simplesse fat replacer with its *NutraSweet* sugar substitute plus polydextrose as a bulking agent for 80-90 calories per 4-oz. serving, or "two-thirds less than superpremium ice cream." In the novelty segment, Slim-Fast Foods introduced high-fiber *Ultra-Slim Fast Crunch Bars*, fortified with oat bran and yogurt-coated for only 110 calories per bar. According to *U.S. Industrial Outlook 1992* (Dept. of Commerce), demand for hard-pack frozen yogurt soared 91.5 percent and dollar shipments jumped 21 percent in 1991. This spurred 27 more new frozen yogurts last year atop the 51 introduced in 1990. Many of these new entries actually contain active cultures to conform to the FDA standard of identity for yogurt.

Spreads: Land O' Lakes introduced *Light Butter*, a blend of butter, water and skim milk with one-third less fat and cholesterol than regular butter. Fifty-two percent butterfat, it contains "none of the partially-hydrogenated vegetable fats used in margarines," and is recommended as a spread or toppping but not for baking or frying because of its water content. Borden introduced *Cannola Premium Margarine*, based on buttermilk and canola oil and claimed to be the lowest in saturated fat of any margarine,

while Fleischmann launched *Move Over Butter*, a cholesterol-free 72-percent vegetable-oil spread also incorporating buttermilk. Chef Gregory's Classic Foods introduced whipped butter in six "European-style" flavors; Land O' Lakes unveiled *Fresh Accents Butter* in two flavors. KGF offered cholesterol-free *Touch Of Butter Squeeze Spread* in a plastic squeeze bottle, plus cholesterol-free *Kraft Alternatives Spread*.

Yogurt: Most unique introductions: *Yogurt Plus* "European-style" yogurts in cucumber, mixed vegetable and plain varieties from Yogurt Plus Co.; *Yoplait Pudding*, "the first pudding with real yogurt" (including active cultures), in three flavors from Yoplait USA (General Mills).

MEAT/POULTRY

More than half (58 percent) of meat/poultry products introduced last year were tagged as "low fat." But if the FDA and USDA labeling proposals published last November take effect as regulations, many won't *be* "low fat" after May, 1993. (Under FDA's proposed "low fat" descriptor, also adopted by USDA, only products containing three percent fat or less by weight will qualify as "low fat," and the "percent fat-free" claim may be used only on "low fat" products; i.e., those 97-percent or more fat-free.)

New meat and poultry products launched in 1991 totaled 115 (316 SKUs), down one percent from the 128 meat/poultry products unveiled in 1990. Sixty-two of these (175 SKUs) are red-meat products, down from 76 in '91; 53 (141 SKUs) are poultry products, nearly even with the 52 introduced in '90. Most are refrigerated; a few are frozen.

According to Marketing Intelligence, however, few were truly "new." Less than ten percent of last year's meat/poultry introductions meet MI's criteria for innovation. Among them: *American Bison Salami* from Denver Buffalo Co.; *Ball Park Pretzel Dogs* (hot dogs in soft pretzels) from Kahn's & Co. (Sara Lee); *Lean & Luscious Ground Beef, Water & Carageenan Product* (50 percent less fat) by Tops Markets in Buffalo, NY; *Reindeer Meat Sausage* from Alaska Sausage Co.

Twenty-one new meat/poultry products are labeled "fresh," although some won't meet the proposed FDA/USDA descriptor defining "fresh" as raw food which has not been frozen, processed or preserved. No less than 22 new meat/poultry products push the health-claims envelope with labeling as "natural," whatever that means—a descriptor FDA and USDA have yet to tackle.

Weight Watchers International (Heinz) packaged turkey and ham products under its *Premium Lean Cut* label, plus several turkey, ham and bologna products in its *Deli Meats* line, all positioned between 90 and 99-percent fat-free. Bryan Foods (Sara Lee) launched the *Bryan Light* luncheon meats "formulated for Southern tastes," smoked pork chops, boneless ham and low-sodium wieners, all tagged 96 or 97-percent fat-free. Products packaged for extended shelf life include *Jennie-O Lean Cuts*, fresh turkey products in modified-atmosphere (MAP) packaging from Jennie-O Foods, and Oscar Mayer's *Deli-Thin* 96 percent fat-free Honey Ham and Roast Beef in resealable *Zip-Pak* barrier-plastic pouches. In the frozen segment, ConAgra extended its *Healthy Choice* brand with chub packs of ground beef tagged 96-percent fat-free.

Three ConAgra subsidiaries introduced turkey bacon while Wampler-Longacre unveiled turkey chops and Shenandoah launched turkey burgers. Outlook for 1992: More low-fat ground-beef and pork-sausage products, incorporating new fat replacers unveiled late 1991.

'Healthy' Tags On New Meat/Poultry Products, 1991

Low fat	67
Low calorie	18
Low cholesterol	8
No cholesterol	2
Fresh	21
Natural	22
Pure	4
Low salt/sodium	13
No additives/ preservatives/MSG	12

Source: Marketing Intelligence Service, Ltd.

1992 EQUIPMENT BUYERS SURVEY:

Weathering the Recession

As automation continues to significantly impact the food processing industry, recessionary cautions are temporarily slowing modernization efforts in 1992.

ROBERT E. HARVEY
MANAGING EDITOR

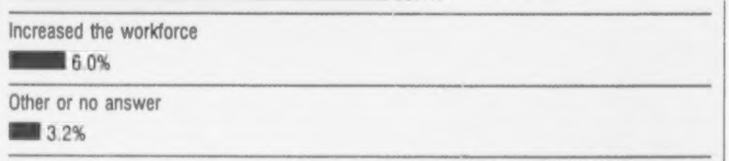
Concerned more with stoking the home fires to ward off recessionary chills then venturing out onto an icy limb, food companies are making new equipment purchases a lower priority this year than last.

The irony, however, is that although interest in new equipment may be down, budgets for equipment are up, according to a survey of *Food Engineering's* 400-member Executive Advisory Panel. Also holding strong are production rates, noted the panel.

Despite the realities of high budgets and strong production, however, food companies seem determined to circle the wagons, assume a recessionary posture, take fewer risks, and adopt a wait-and-see attitude.

Evidence of this cautionary approach can be seen by comparing the company-wide purchasing priorities of 1991 with those of 1992. Across the board, the high priority purchases of

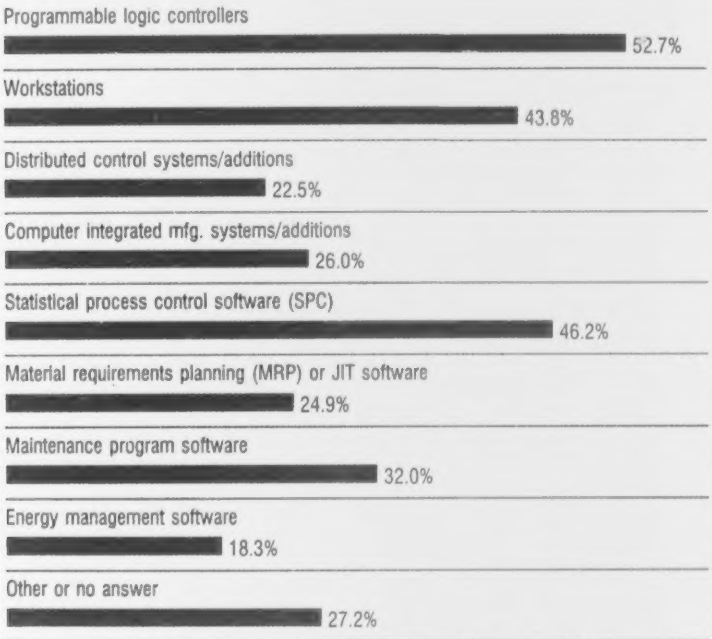
Impact of Automation on Workforce



Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering's Process Equipment Buyers Survey 1992.

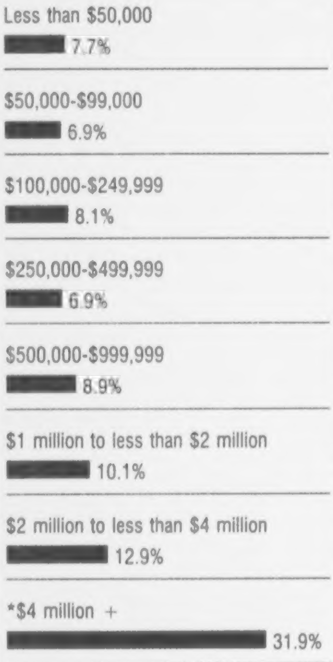
Location Process Control Purchases (planned)



Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering's Process Equipment Buyers Survey 1992.

Company-Wide Budgets for Equipment Purchases



*For companies with 500 or more employees, the percentage is 54.8.

Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

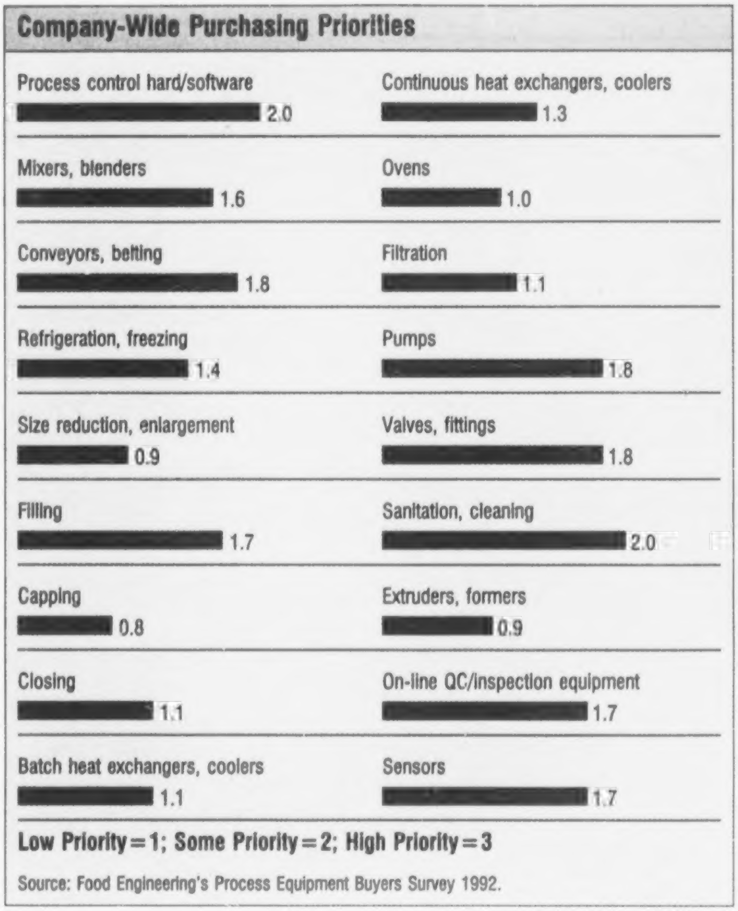
Source: Food Engineering's Process Equipment Buyers Survey 1992.

1991 became less desirable in 1992. Of 18 different equipment categories surveyed, none commanded as much demand this year as last. The equipment that fell the furthest on *FE's* priority scale (1 = low priority, 2 = some priority, 3 = high priority), includes capping equipment (falling off from a 1.93 priority rating in 1991 to 0.8 this year), extruders and formers (falling from 1.78 to 0.9), and size reduction and enlargement equipment (from 1.59 to 0.9).

Commodity items such as pumps, valves and belts; sanitation equipment; and high-tech devices such as sensors, inspection equipment and process controls, slipped least in their priority status, compared to 1991.

If equipment buying is less of a priority, budgets for equipment purchases remain high. Despite the recession, of all the companies surveyed, 55.0 percent reported equipment budgets of over $1 million (compared to 53.0 percent in 1991 and only 47.6 percent in 1990).

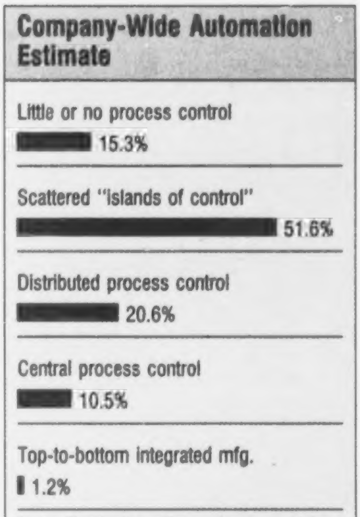
In other good news for equipment suppliers, food production continues to accelerate. Survey respondents report that production increases in 1992 (at their location) will dip only slightly below 1991 levels. For example, in 1991, 77 percent of those polled forecast that production would increase over year-earlier totals. For 1992, that percent had slipped—but only slight-



Company-Wide Purchasing Priorities

Low Priority = 1; Some Priority = 2; High Priority = 3

Source: Food Engineering's Process Equipment Buyers Survey 1992.



Company-Wide Automation Estimate

Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering's Process Equipment Buyers Survey 1992.

ly—to 71 percent. And when queried about expected *company-wide* production increases, some 79 percent predicted increases this year vs. 1991's 82 percent.

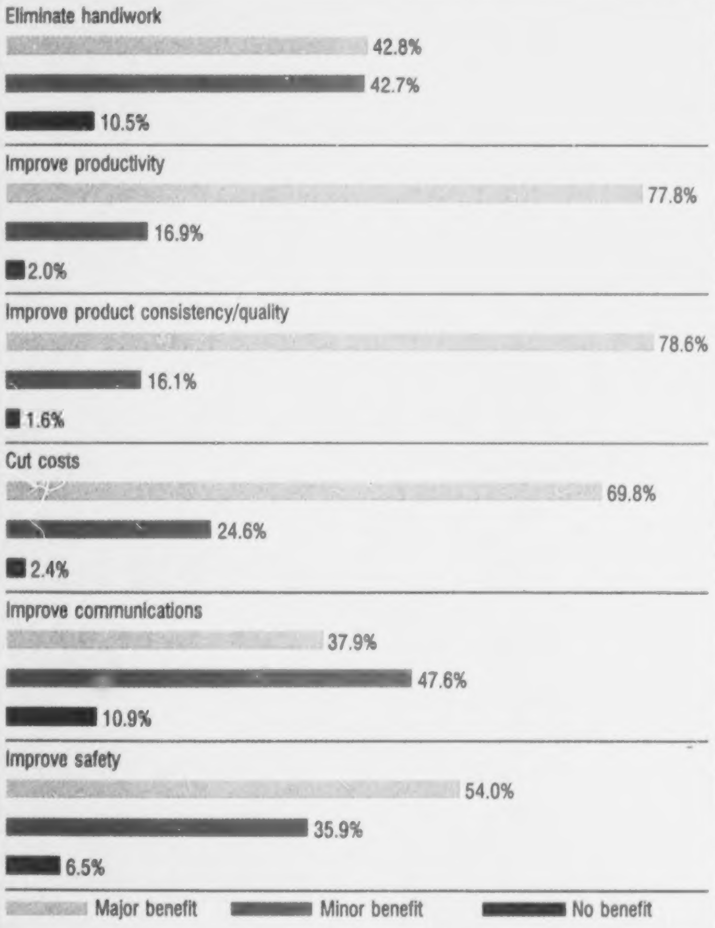
If the recession is not slowing production or shrinking budgets, it appears to have slowed down modernization efforts. Companies continue to make due with islands of automation, with little effort to move toward increased distributed or centralized control, according to the survey.

Similar to last year, some 72 percent of those surveyed said automation in their firms was spotty (scattered "islands"), 12 percent admitted to little automation, while 15 percent proclaimed operations completely, or almost completely, automated.

If new automation efforts have slowed to a crawl in recent months, increased automation over the past several years continues to significantly impact operations, say all but 19 percent of the survey's respondents. While those 19 percent noted no impact on the workforce at their location due to new automation introductions, some 65 percent said automation has resulted in increased training, 39 percent cited employee reductions, and 42 percent (a significant increase over last year's 36 percent) reported increased demands for better-educated production workers.

EQUIPMENT BUYERS SURVEY

Expected Impact of Automation on Company



Note: Total of numbers shown may be more or less than 100% due to multiple answers or no response.

Source: Food Engineering's Process Equipment Buyers Survey 1992.

The education is needed because more responsibility is being given to machine operators for on-line quality measurement, said the panel. When asked if operators at their location have been given more responsibility, 63 percent responded affirmatively.

Along with a shift in responsibilities has come a reorganization of plant personnel. Asked what organizational changes have taken place over the past three years: 30 percent said supervisors are responsible for more personnel, 60 percent said the workforce is more team oriented, 22 percent indicated an increase in the ratio of hourly to salaried workers, 18 percent noted new configurations of shift hours, and 60 percent reported increased operator training.

Along with the workforce, specific disciplines within the factory, such as quality assurance/quality control (QA/QC), are evolving as well. When asked how the QC/QA function has changed over three years, 42 percent said it had expanded, although 17 percent said it had been scaled down. Some 23 percent said it was now more automated, while 39 percent said that their QA/QC operations had been reorganized. On the other hand, 24 percent noted little change.

While currently not a top priority, the panelists see an increasing need to invest in automation over the long haul. The types of automation the responding panelists would like to see developed run the gamut from: new machines to reduce sand in shellfish; equipment to grade fresh cucumbers by diameter size and then by shape; systems which would distinguish parts of a frozen cut up chicken and then sort, count, and package them.

They also desire on-line accurate and reliable automatic moisture analysis (several respondents); pit detectors that really work; devices that remove specks from applesauce; and better particle-detection devices of all sorts.

Along with specific requests, panelists wanted automation that addressed more general concerns as well. The these concerns focused primarily on the need for: more flexibility, more product uniformity, more safety, more computer automation and networking capability, more robotic packing lines, and—not surprisingly—more American-made food processing equipment. The panelists also wanted to see less handwork (along with more vision systems to reduce that handwork). ▲

PACKAGE RECYCLING: PROBLEM

Recycling is underway in the U.S. market but the ramifications and the costs are still being sorted out.

MARGIE J. RUSSELL
TECHNICAL EDITOR

There is a war going on in the alleys and curbsides of American cities. Environmentalists think it is great but the packaging industry now wonders if it's worth the price. The war is the removal and the recycling of the thousands of pounds of food packaging discarded every day by American consumers. These same consumers are told by their municipal leaders to sort this discarded material and place it in various containers for pick-up.

Now the war begins.

Who takes these materials? Where do they go? What happens to them? And, most importantly, how much does all this cost?

Jerry Taylor, director of natural resources studies at the Cato Institute in Washington, DC, meets these questions head-on and tries to sort out the myths and realities of the country's solid waste issue. He points to a *Forbes* piece from last October which stated that recycling seems to be the preferred method for dealing with this issue but it can be pushed too far, and no one wants to be the one to shoot "Snow White." "However," says Taylor, "I would like to suggest that killing Snow White would be an act of self defense in this case. Either we kill her or she kills us." Taylor admits this sounds harsh but "an examination of municipal solid waste recycling finds that the ideal scarcely represents the reality."

So what's going on?

It is now estimated that 10 percent of all municipal solid waste in the U.S. is recycled. This figure should rise to 25 percent by the end of the year if all goes according to the goals designed by the Environmental Protection Agency.

The modern-day recycling process

Consumers have jumped on the recycling bandwagon as the number of recycled rigid containers continues to rise.

is not complex. Each material is separated from the waste stream, processed into a usable form, and sold to an end market user. According to The Council for Solid Waste Solutions, three essential components are required for the success of any recycling program:

1) a continuous source of recyclable material;
2) a significant volume of recyclable material;
3) end-use markets for recycled products which provide adequate market values for the material being recycled.

Everything in between these steps is, unfortunately, complicated. The recycling process and programs that support it can be compared to a Catch-22 scenario: markets will not be established if a steady supply of material is not readily available and recyclers will not push their processes unless end markets are in place. It is very expensive to run recycling programs. But, recycling programs inherently provide several benefits to the industry: they prevent new waste from entering landfills, they provide a ready source of raw materials, and they carry an enormous amount of economic influence on the various markets in the packaging industry.

For example, aluminum, without question, has the most successful recycling rate of any packaging material in history. It is very energy intensive to produce aluminum from raw ore but energy is significantly reduced when the manufacturing is done with recycled material. With a recycling rate in the range of 50 to 60 percent and a recycled aluminum content approaching 50 percent in each can, it is no wonder the aluminum industry is the champion of the recycling world.

And in order to get more scrap aluminum returned, Reynolds Metals Company, Richmond, VA, now emphasizes the establishment of buyback centers in those communities with curbside collection programs. The company believes that curbside collection has a lot of merit but is only one part of a comprehensive solid waste management strategy. A total solution, says Reynolds, must include buyback centers where people get paid directly for their recyclable material.

[illegible]

Material	Lbs./day collected	Market value (dollars/lb.)	Total value (in dollars)
Aluminum	60	.35-.40	21.00-24.00
Clear glass	840	.01-.02	8.40-16.80
Green glass	360	0.1-0.2	3.60-7.20
Brown glass	180	.01-.02	1.80-3.60
HDPE/PET	300	.06-.08	18.00-24.00
Newspapers	3,960	(-.01)-0.0	(-39.60)-0.0
Steel cans	300	.03-.04	9.00-12.00
Total	**6,000**	–	**$22.20-$87.60**

Source: R.A. Perkins, The Council for Solid Waste Solutions.

A study conducted by The Council for Solid Waste Solutions analyzed a typical collection and sortation program of recyclable materials in the Midwest. This chart highlights the amount of each material collected and the range of market values for each material involved in this program.

The glass market uses recycled material in new glass manufacture providing substantial energy savings, but the savings is not as high as that seen in the aluminum market. Recycled glass, or cullet, is used as a raw material in glass manufacturing and is crushed and mixed with sand, limestone, and soda ash and formed into

OR SOLUTION?

new containers.

Owens-Brockway, Toledo, OH, has paid for recyclable material collected by municipalities and individuals: over $300 million in the past 10 years. The company claims it has accounted for more than half of the two million tons of glass containers recycled in the U.S. in 1990 and by recycling more than one million tons of glass, 4.5 billion containers were kept out of landfills.

And do not forget about the elderly grandfather of packaging, the steel food can, which reached a recycling rate of 25.6 percent in 1990. With 1991 rates out soon, the Steel Can Recycling Institute (SCRI) expects to see another healthy gain in the recycling rate for all steel cans. (For further details on the steel industry, see the sidebar story from the SCRI.)

A new family of biodegradable materials from Novon Products Group is targeted for the packaging industry for such applications as dairy containers, food service, and loose-fill protective packaging as shown here. (Source: Warner-Lambert Company.)

The plastics industry, however, has problems inherently all of its own – consumers perceive that plastics cannot be recycled, they take up too much room in a landfill, and they are bad for the environment.

"Developing an expanded recycling infrastructure for plastics is very much like the chicken and egg enigma," said Jery Huntley, director of recycling, The Council for Solid Waste Solutions, Washington, DC during a talk at the conference, Recycling: Is It Really the Answer?, sponsored by The Packaging Group, Inc. (Milltown, NJ). "Which part of the infrastructure comes first: collection, handling, reclamation, end-use markets? We decided that it has to be markets first because of the economic interdependence at each stage of the process. If collection is taking place and a handler prepares post-consumer plastics for recovery with no markets in sight, then the entire process stalls."

Huntley pointed out that the Council has worked to infuse vitality into post-consumer plastic markets since the amount of collected material will continue to increase. A study completed for the Council revealed that approximately 225 million pounds of polyethylene terephthalate (PET) were recycled in 1990, an increase of 38 percent over 1989 and 160 million pounds of high density polyethylene were recycled in 1990, representing a growth rate of 111 percent over 1989. And with the approvals for the decomposition processes like hydrolysis, methanolysis, and glycolysis coming on stream, this rate should increase since a steady supply of material will be required. Eastman Chemical Company (Kingsport, TN), Hoechst Celanese (Greer, SC), and Goodyear Tire and Rubber Company (Akron, OH) are the three resin suppliers currently involved in the commitment to this form of plastics recycling.

However, the current supply of recycled plastic exceeds demand and the number of recycling programs now collecting plastic has increased exponentially in the last year. A soft economy has caused the price of virgin plastic to fall, in some cases below the price of recycled plastic, further reducing demand for post-consumer material. "But," said Huntley, "as the economy rebounds, virgin plastic will become more expensive than recycled, and post-consumer plastic will look more attractive to manufacturers of plastic products."

Even though these numbers for each segment appear impressive, Cato's Jerry Taylor points out that if recycling is viewed as a "silver bullet" capable of managing most of the country's solid waste, then the industry and the public are sadly mistaken. "An objective examination of the waste stream indicates that the high recycling rates often mandated by legislation are simply unreachable,"says Taylor, "and when participation rates and collection economies are factored in, only about 18 percent of the waste stream can conceivably be collected for recycling. The industry must get this information out and stress that 'there is no fire.'"

Unfortunately, solid waste will not just disappear. Trying to make it "disappear" has already been tried with

SPECIAL
EMPHASIS:
RECYCLING

Just like the "battery," the steel can keeps on going

Steel cans have been bringing food to our tables in America and across the world for over a century, often under the name of "tin" cans. In the last 100 years, steady improvements to the "original" steel can have resulted in a strong and durable package containing more than 1,500 different foods.

Along with steady packaging improvements, the recycling of food cans continues to improve, and in fact, gain momentum. From 1988 to 1990, the recycling of all steel cans increased by 64 percent. In 1990, one in four food cans was recycled. There are many reasons for the continuing increase in these recycling rates. The first reason is that the SCRI, with the support of the steel industry and its member companies, has long believed in a grass roots approach to recycling. The phrase, "think globally, act locally," holds especially true for recycling. Very often, community X recycles five materials while community Y, right next door, recycles only two. Direct contact and market assistance will ensure that recycling is both a "global" and a "local" concern. The SCRI's seven regional recycling offices help to provide this grass roots support necessary to the development of recycling programs.

Second, broad recycling options assist recycling programs. Steel cans are recycled through curbside collection, drop-off and multi-material recycling programs, and through magnetic separation at resource recovery facilities with steel recovery rates often exceeding 90 percent.

Let's not forget markets. Steel cans have the benefit of a strong end market. The steel industry, with an overall recycling rate of 66 percent, is a welcome home for post-consumer steel cans, where they will become new cans, cars, appliances, toys and construction materials, to name a few. Additionally, the detinning industry, which has long worked hand-in-hand with the steel industry, also collects steel cans for recycling.

Another reason for steel's success is cooperation – from the consumer to the food service manager, from the recycling coordinator to the steel buyer, no one does it alone. In recognition of this fact, communities large and small put great effort into educating their citizens, school children and business leaders on the benefits of recycling.

Another very important cooperative link in the recycling chain is the so-called "front-end:" the can manufacturers, fillers, packers and grocery retailers. Their role often comes before the cans are recycled, but their support of recycling and efforts toward education and awareness are critical. The SCRI has seen its member companies support recycling to a great extent. These companies and organizations recognize that a recycled steel can is a resource for tomorrow.

As the SCRI works toward its goal of at least a 66 percent recycling rate by 1995, its efforts extend in many directions. The regional recycling offices continue to work to build the steel can recycling infrastructure. Extensive state legislature monitoring is helping to ensure that steel cans, steel products and other recyclable materials receive just consideration in the legislative arena. Marketing programs targeted toward enhancing recycling awareness and participation are pushing outward across the country. Educational programs from pre-school through college are being developed to ensure that tomorrow's citizens enjoy the benefit of responsible solid waste management today. And, the SCRI is well on its way toward developing a comprehensive data base that will help consumers locate the nearest steel can collection program for recycling.

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the biodegradable theory; the market and interest in these films were driven by the understanding that the materials would eventually disappear in landfills or evaporate into the air. Since most landfills resemble sealed-up tombs, there is little way naturally occurring materials like air and water can work on and break down degradable films.

Yet, new research and developments in the biodegradable plastic area continue although with not as much fanfare as in past years. One particularly interesting product with implications for several industries is the *NOVON* specialty polymers line from the Novon Products Group, a division of Warner-Lambert Company. This line of materials combines the performance of plastics with the decomposition benefits of paper.

Products made from NOVON specialty polymers biodegrade completely in biologically-active environments such as those found in aerobic composting. The materials are made primarily from starch. The product is not classified as a degradable plastic or a masterbatch, according to Rhonda Brooks, vice president, marketing and sales for Novon Products. "The polymers are an excellent choice for packaging applications such as dairy containers and lids, margarine tubs, candy wrappers, and portion wrapping," said Brooks. The company is also targeting the food service packaging industry where the waste problem is extremely visible. Potential applications here include cutlery, thermoformed containers, drink lids and straws. ▲

CHILTON'S
APRIL 1992

FOOD ENGINEERING

SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

CONVENIENT PACKAGES FOR CONVENIENCE FOODS

FOOD LABS '92
CONFERENCE
SEE P.48

FOOD
ENGINEERING

ABOUT THE COVER

Despite the recession, convenience foods, made more convenient by recent advances in packaging, continue to score with consumers looking for foods that require less time and energy to prepare.

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JESSE H. NEAL
AWARD-WINNING
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INDUSTRY REPORT

Opportunities prevail south of the border

U.S. food processing companies will do well to run for the border, now that Mexico's improved economy, consumer spending and changing lifestyles have made it a prosperous country to do business with, according to a study conducted by A.T. Kearney, New York.

Companies such as Sara Lee, Pepsico and Kraft have become so established in Mexico that their brand names have become household names in Mexico, according to Aliza Chelminisky, vice president of the Mexican Investment Board, New York. The Kearney study predicts that many large food processing companies not currently in Mexico will seek to enter the market through building a plant or acquiring local companies. Established firms will maximize export opportunities and develop local consumer demand. Referring to the country of 80 million, a U.S. executive said, "Mexico has the highest profit margins of all our Latin American operations." Mexico has three growing seasons (as opposed to two in California) and labor intensive operations, such as vegetable processing, are cost-effective.

Company	Revenues	Products
CPC International	$5.1 B	Corn refining, canned goods
Dean Foods	2.0 B	Dairy, canned/frozen vegetables
Kraft General Foods	10.4 B	Packaged foods
Pepsico Foods	672.0 M	Snack foods
Sara Lee	11.6 B	Packaged foods
Stokely	272.0 M	Canned/frozen fruits, vegetables

Source: A.T. Kearney.

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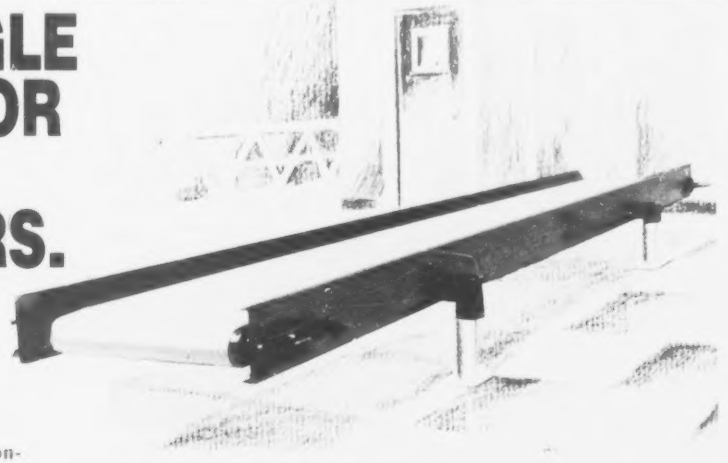

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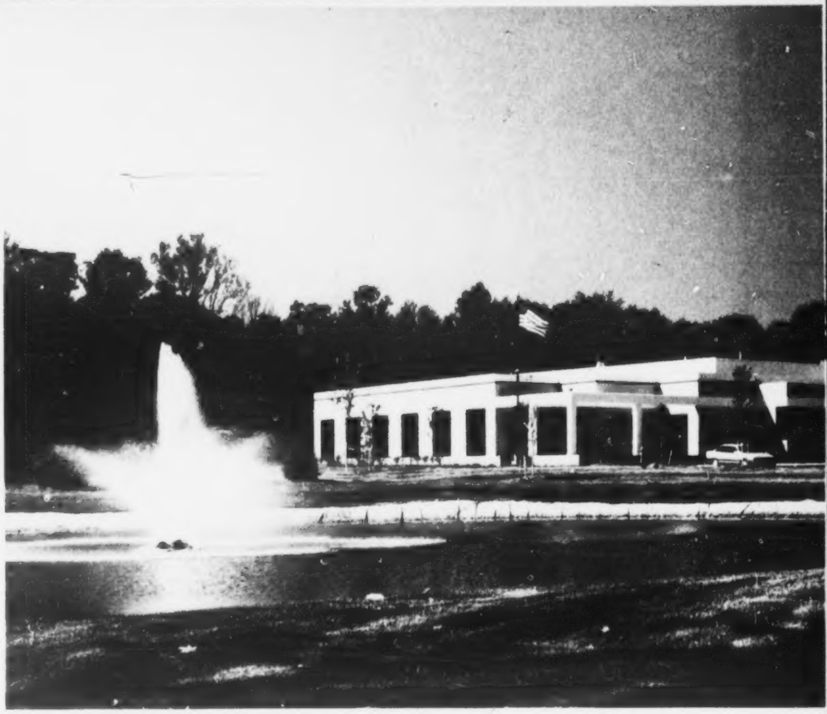
15th ANNUAL NEW PLANT CONSTRUCTION



The slump in the economy finally slows down food plant construction. And, sake comes to America while red meat plant construction flexes more muscle than poultry plants.

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

The recession has finally made its mark in food plant construction with this year's total of 305 representing a dramatic decrease from 1990's survey total of 456 and 1989's 390. Last year's *Food Engineering's* annual new plant and renovation survey switched from the November issue to April and only six months were counted, making other than percentile comparisons pointless. As in years past, we have compiled our results from data provided by Conway Data, Inc., Norcross, GA and our own mailed survey to approximately 220 architectural/engineering firms throughout the U.S. Continuing a trend, some 52 percent of the projects were renovations or expansions, as opposed to new plants. As budgets tighten, companies have a tendency to renovate or expand, rather than build new plants.

Scanning survey results uncovered an interesting development. Has the U.S. love affair of things Japanese—cars, VCRs, stereo equipment—embraced of all things, sake? Two sake plants are slated for construction, one in Fairfield, CA, a state well-known for its high Asian population, and the other in Coor's beer territory—Golden, CO.

A dramatic shift has occurred between the amount of meat versus poultry plants. In recent years, the U.S. has shifted from being a meat and potatoes country to a diet-conscious society that has shown a preference for poultry and fish. This year's survey shows a slight reversal in this trend, though it is difficult to tell whether this will continue. In 1990's survey, close to 11 percent of construction projects were dedicated to poultry plants while meat was a paltry six percent. But in 1992, poultry plant construction dropped to six percent while meat expanded to 8.2 percent.

Like a lot of businesses last year, a number of architectural/engineering firms reported that business was off. And like the rest of the country, we'll have to wait to see whether the good times predicted for spring of '92 really bloom.

Five Kraft Foodservice distribution centers were part of this year's new plant construction and renovation survey. (Source: Haskell Co.)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
A								
A.E. Staley Mfg. Co.	Van Buren, AR	Starch products	Exp.	–	8	–	–	1992
Ace Baking Co.	Williamsport, MD	Ice cream cones	New	20	–	–	–	–
Advance Food Company	Enid, OK	Food products	Exp.	150	9.6	–	–	Summer 1992
Advance Meat Co.	Enid, OK	Meat products	Exp.	157	–	370	–	–
Ag Processing Inc.	Southeast SD	Starch	New	100 acres	300	200	PSI Group	Spring 1994
AGCO Inc./Farmland Industries	Russell, KS	Wheat starch	New	–	5	–	–	–
Aldi	Springfield, OH	Food products	New	375	–	–	Food Plant Engineering	Spring 1993
Alltech	Nicholasville, KY	Yeast	Exp.	–	1.5	–	–	–
Ambrosia Chocolate	Milwaukee, WI	Chocolate	New	320	93	350	Jones Group Lockwood Greene Davy McKee	June 1992
American Crystal Sugar Co.	East Grand Forks, MN	Molasses proc.	Exp.	–	34		–	–
American Egg Products	Blackshear, GA	Egg products	New	36	2.5	–	Haskell Group	Feb. 1992
American Food Corp.	Beloit, WI	Snack foods	New	26	–	–	–	–

FOOD PLANT SURVEY

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
American Maize Products	Hammond, IN	Corn syrup	Exp.	–	5.2	–	–	1992
American Meat Protein Co.	Fremont, NE	Meat protein	New	70	1	–	–	–
Amexon	Youngstown, OH	Snack foods	New	200	6	50	–	–
Anderson-Erickson Dairy	Des Moines, IA	Dairy	New	–	–	240	–	Oct. 1991
Anheuser-Busch	Jacksonville, FL	Beer	Exp.	–	40	–	–	–
Arctic Alaska Fisheries	Seattle, WA	Seafood processing	New	100	–	–	–	Nov. 1991
Arctic Alaska Fisheries Corp.	Newport, OR	Fish meal	New	–	5	–	–	–
Atlantic Coast Protein	Selma, NC	Enzymes	New	–	1.5	–	–	–
Avonmore, West	Gooding, ID	Cheese	Renov.	48	10	–	Mead & Hunt	April 1991
Azar Nut Co.	El Paso, TX	Peanuts	New	160	–	250	–	–

B

B&B Onion	Hugo, OK	Vegetable proc.	New	–	–	70	–	–
Beef Products, Inc.	Joslin, IL	Beef	New	–	–	–	–	–
Beef Products, Inc.	Waterloo, IA	Pork	New	–	–	–	–	–
Bagel Bites	Fort Myers, FL	Food products	Exp.	51	–	–	–	–
Bama Foods	Tulsa, OK	Biscuits	New	135	40	150	Webber/Smith Lockwood Greene	July 1991
Barber's Dairies	Birmingham, AL	Milk	Exp.	40	3	–	Webber/Smith	Fall 1991
Bar-S Foods	Clinton, OK	Meat processing	Exp.	56	7	100	–	–
Bar-S Foods	Altus, OK	Hot dogs	New	150	–	400	–	–
Beef Products	North Sioux City, SD	–	New	30	3	70	–	–
Beef Products	Finney Cnty., KS	Processed meat	Exp.	–	5	–	–	–
Ben & Jerry's	St. Albans, VT	Ice cream	New	105	20	150	Webber/Smith	Summer 1993
Ben & Jerry's	St. Albans, VT	Ice cream	Exp.	10	1	100	Webber/Smith	June 1992
Ben & Jerry's	Bellows Falls, VT	Ice cream dist.	New	45	3	25	Webber/Smith	June 1992
Ben E. Keith	San Antonio, TX	Foodservice dist.	New	100	6	100	Webber/Smith	Fall 1992
Best Foods	Santa Fe Springs, CA	Mayonnaise	Exp.	20	20	–	Austin Co.	Complete
Best Foods	Franklin, NJ	Tech center	New	–	–	–	Austin Co.	–
Bi-Lo	Mauldin, SC	Ice cream dist.	Exp.	50	3	6	Webber/Smith	March 1992
Blue Bell Creameries	Ruston, LA	Ice cream	New	–	1.2	–	–	–
Blue Bell Creameries	Broken Arrow, OK	Ice cream	New	110	–	100	–	1993
Borden	St. Louis, MO	Pasta	New	300	50	230	Wetterau Builders	Dec. 1991
Brooks Sausage Company	Pleasant Prairie, WI	Sausage	New	50	7	100	–	Spring 1992
Brown's Bakery	Defiance, OH	Baked goods	Exp.	–	1.4	–	–	–
Bruce Foods Corp.	Cade, LA	Food products	Exp.	75	–	–	–	–
Budco Distributing Co.	Monroe, LA	Distribution center	Exp.	–	1.4	–	–	1991
Burnett Dairy	Grantsburg, WI	Cheese	Exp.	10	600	–	Mead & Hunt	Dec. 1991
Burris Refrigerated Services	Chesapeake, VA	Distribution center	New	74	–	–	–	July 1991
Burris Retail Food Systems	Harrington, DE	Distribution center	Exp.	51	–	–	–	April 1991
Butterkrust Bakeries	Lakeland, FL	Bread/buns	Exp.	70	10	100	–	–

C

C&C Bakery	Mercedes, TX	Tortillas	New	–	1.8	100	–	–

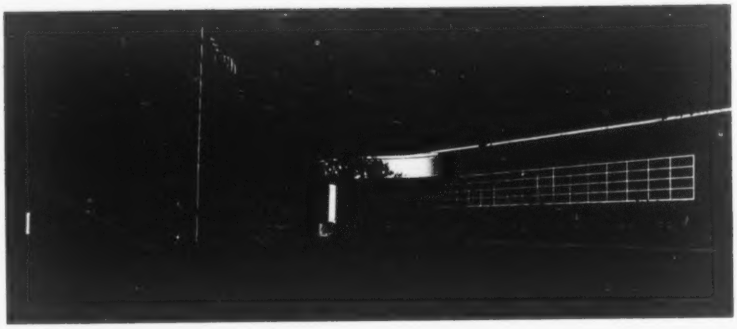
FOOD PLANT SURVEY

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
C.J. Vitner Co.	Freeport, IL	Snack foods	New	100	11.7	250	–	Dec. 1991
CPC International	Winston-Salem, NC	Fructose	Exp.	–	4	–	PSI Group	April 1991
Cagle's	Macon, GA	Poultry processing	Exp.	–	–	500	–	–
Campbell Soup	Camden, NJ	Research center	Addition	125	24	–	Ballinger Sigel Group	1992
Campbell Soup	Paris, TX	Sauce	Exp.	220	17	–	Lockwood Greene	–
Cantisano Foods	Selma, CA	Spaghetti sauce	New	60	–	100	–	March 1992
Cargill	Jacksonville, FL	Chicken processing	Exp.	60	8.3	50	Haskell Group	Feb. 1992
Cargill	Ozark, AR	Turkey processing	Exp.	–	17	80	–	–
Cargill	Eddyville, IA	Corn oil	Exp.	–	15	–	–	–
Cargill	Memphis, TN	Starch	Exp.	–	–	–	PSI Group	–
Cargill	Stockton, CA	Flour	New	–	–	–	Buhler Younglove	Feb. 1992
Cargill Poultry Products	Dawson, GA	Poultry processing	New	85	12.5	–	Haskell Group	Early 1993
Cargill Poultry Products	Buena Vista, GA	Poultry processing	Exp.	50	–	–	Haskell Group	Jan. 1993
Carnation Co.	Hamilton, NJ	Food products	New	600	–	–	–	–
Carolina Food Processors	Tar Heel, NC	Pork processing	New	560	60	–	Stellar Group	Sept. 1992
Carolina Turkey	Mt. Olive, NC	Turkey processing	Exp.	25	5	25	Facility Group	June 1992
Casson Corp.	Bagley, IA	Pet food	New	29	–	–	–	–
Century Ice	Oklahoma City, OK	Packaged ice	Exp.	–	–	75	–	–
Chief Ethanol	Hastings, NE	Dried grains	Exp.	–	15	20	PSI Group	Spring 1992
Cinpac	Cincinnati, OH	Prep. meals	Conv.	180	–	–	Hixson	1991
Citrus Hill Mfg. Co.	Plymouth, IN	Juice	Exp.	–	16	80	–	–
City Provisioners	Ormond Beach, FL	Meat processing	Exp.	78	4	350	H.J. High	April 1992
Club Chef	Cincinnati, OH	Produce	Exp.	–	–	–	Hixson	1991
Columbia Valley Foods	Quincy, WA	Potato	New	150	32	60	Webber/Smith	Fall 1993
ConAgra	Athens, LA	Chicken hatchery	New	48	–	–	–	–
ConAgra Broiler Co.	Farmerville, LA	Poultry processing	New	–	34	–	–	–
ConAgra Broiler Co.	Hurlock, MD	Chicken hatchery	New	–	–	100	–	April 1992
ConAgra	El Dorado, AR	Chicken	Exp.	55	3	150	Webber/Smith	Fall 1992
ConAgra Frozen Foods	Batesville, AR	Food products	Exp.	–	7.6	50	–	–
ConAgra Frozen Foods	Russellville, AR	Food products	Exp.	–	7.6	–	–	–
Continental Foods	Baltimore, MD	Foodservice dist.	Exp.	33	2	50	Webber/Smith	Aug. 1992
Contran	Kerman, CA	Tomato sauces	New	80	6	110	–	June 1992
Cook Dairy Products Co.	Oklahoma City, OK	Ice cream	Exp.	–	1.9	–	–	–
Coors	Memphis, TN	Beer	Renov.	–	100	245	PSI Group Tuchenhagen	Spring 1991
Cooper Farms	Fort Recovery, OH	Feed mill	New	–	–	–	–	May 1992
Cornuts	Fresno, CA	Cornuts	New	55	–	–	Comstock	1991
Corning Nut Co.	Corning, CA	Almond processing	New	30	2.2	–	–	June 1992
County-Fed Meat Co.	Dallas, TX	–	New	–	–	50	–	–
Crestar Foods	Ohio	Bakery	Renov.	–	–	–	Hixson	Planning

D

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Dairyman's Cooperative	Tulare, CA	Milk	Exp.	20	6	–	–	July 1992
Dairyman's Supply Co.	Wildwood, FL	Dairy supply	New	70	2	50	–	June 1991

FOOD PLANT SURVEY



The Cinpac conversion in Cincinnati will manufacture prepared meals. (Source: Hixson.)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Dan Valley Foods	Pittsylvania Cnty., VA	Food products	New	30	–	–	–	–
Dannon Co.	Fort Worth, TX	Yogurt	Exp.	75	20	120	Webber/Smith	Early 1993
Darigold	Sunnyside, WA	Milk	New	65	–	–	Food Plant Engineering	Jan. 1992
Doane Products Co.	Pueblo, CO	Dry dog food	New	100	–	–	–	End of 1991
Dole/Hancock Fidelity	Clewiston, FL	Citrus	New	140	3.5	–	H.J. High	July 1991
Domino Sugar	Baltimore, MD	Sugar	Renov.	–	–	–	PSI Group	Sept. 1991
Dunkirk Ice Cream Co.	Dunkirk, NY	Ice cream	Exp.	20	6	–	–	–
Dutch Gold Honey	Lancaster, PA	Honey	Exp.	30	1.5	–	–	March 1991

E

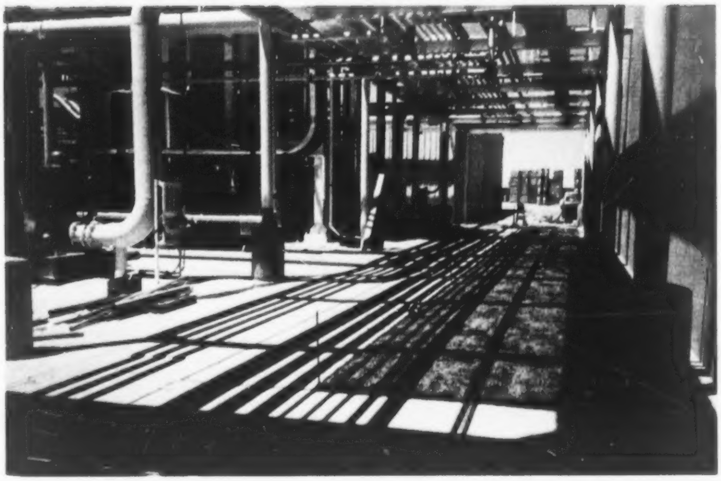
Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Eagle Snacks	Dallas, TX	Snack foods	New	20	–	–	–	–
Eakly Peanut Processing	Eakly, OK	Peanut processing	New	23	–	–	–	–
East Balt Commissary	Chicago, IL	Baked goods	Exp.	25	3	15	Webber/Smith	–
ECO Farms	Mira Loma, CA	Citrus packing	New	47	–	–	–	Aug. 1991
Elgin Dairy Foods	Hillside, IL	Dairy	Exp.	11	–	–	–	–
Excel Corp.	Friona, TX	Beef processing	Exp.	–	11	–	–	1992

F

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employees	Architects/ Engineers	Status & Date
Fiorucci Foods Corp.	Colonial Heights, VA	Distribution	Exp.	12	1	65	Haskell Group	Jan. 1991
Flav-O-Rich	Canton, MS	Dairy	Renov.	–	–	–	Hixson	Spring 1992
Florida Crystals	Okeelanta, FL	Sugar	Add.	–	15	–	PSI Group	Planning
Folger Coffee Co.	New Orleans, LA	Coffee	Exp.	20	60	–	Fru-Con Engr. Bechtel	–
Folger Coffee Co.	Kansas City, MO	Coffee	Renov.	–	–	–	Fru-Con Engr.	1991
Frito-Lay Co.	Fontana, CA	Food products	New	182	–	–	–	–
Frito-Lay Co.	Modesto, CA	Distribution center	New	210	–	–	Haskell Group	Feb. 1991
Frito-Lay Co.	Modesto, CA	Distribution center	Exp.	50	–	–	Haskell Group	June 1991
Frito-Lay Co.	Vista, CA	Snack storage	New	20	1	20	Facility Group	March 1992
Frito-Lay	Vancouver, WA	Food products	Exp.	45	–	–	–	–
Frito-Lay	Aberdeen, MD	Chips and dips	New	–	–	300	–	–
Frito-Lay	Beloit, WI	Snack foods	Exp.	50	–	150	–	Early 1992
Frito-Lay	Aberdeen, MD	Distribution center	New	260	–	–	Haskell Group	April 1992
Fruit Growers Supply	Orange Grove, CA	Citrus	New	24	1	20	Foodpro Int'l.	Aug. 1992

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
G								
Galaxy Cheese	Orlando, FL	Cheese products	New	55	—	70	—	—
General Foods USA	Winchester, VA	Food products	New	135	—	200	—	—
General Mills	Albuquerque, NM	Cereal	New	—	128	—	United Engrs. & Constructors	June 1992
Golden Peanut Co.	Camilla, GA	Distribution center	Exp.	42	—	—	Haskell Group	Jan. 1991
Golden Poultry	Russellville, AL	Poultry processing	Exp.	—	27	—	—	—
Gordon Food Service	Grand Rapids, MI	Food distribution	New	250	36	100	Webber/Smith	Spring 1992
Grain Processing	Muscatine, IA	Starch	Exp.	—	—	—	PSI Group	Aug. 1991
Great Lakes Inc.	Newport, TN	Sucralose	New	—	40	60	PSI Group	April 1991
H								
Haagen Dazs	Tulare, CA	Ice cream	Exp.	10	1	15	Facility Group	Jan. 1992
Hannaford Bros. Co.	Schodack, NY	Distribution center	Exp.	70	—	13	St. Onge, Ruff and Associates	Nov. 1991
Heaven Hill Distilleries	Bardstown, KY	Bourbon	Exp.	—	3	—	—	—
Herbe	Garland, TX	Pet food	New	—	—	50	—	—
Hershey Chocolate USA	Reading, PA	Candy	Exp.	—	13	—	—	—
Hershey Chocolate USA	Derry Township, PA	Chocolate	New	130	100	—	Sverdrup	—
Hershey Foods Corp.	Winchester, VA	Pasta products	New	180	60	100	—	1993
Hershey Pasta	Fresno, CA	Pasta	Exp.	100	10	120	—	Sept. 1992
Highland Foods Co.	Abilene, TX	Meat processing	New	360	—	83	—	—
Hilal Meat & Food Co.	Bladenboro, NC	Chicken processing	New	—	2.5	60	—	—
Hills Brothers Coffee	Casa Grande, AZ	Coffee	Exp.	34	—	—	—	—
Hill's Pet Products	Richmond, IN	Pet food	New	200	80	200	Epstein & Sons	June 1991
Hillshire Farm	Kentucky	Meat	Exp.	—	—	—	Hixson	Summer 1992
Hudson Foods	Albertville, AL	Poultry processing	Exp.	—	11.3	150	—	Late 1992
Hughes Markets	Irwindale, CA	Grocery storage	New	780	40	250	Facility Group	Jan. 1993
Hunt-Wesson	Helm, CA	Canned tomatoes	Exp.	60	10	100	—	—
Hy-Vee Food Stores	Chariton, IA	Perishables	New	138	—	—	Food Plant Engineering	1992
Hy-Vee Food Stores	Chariton, IA	Perishables	Exp.	55	—	—	Food Plant Engineering	1992
I								
International Multi Foods	Rialto, CA	Frozen burritos	New	96	—	—	—	—
Indulac	Barceloneta, PR	Dairy	New	115	17	57	JAI Engineers	Dec. 1993
IPC	Kentucky	Ingredients	New	—	—	—	Hixson	Fall 1992
J								
J-M Foods	Miami, OK	Vegetable proc.	New	20	—	—	—	—
Jan's Frozen Foods	Pierre, SD	Vegetarian pizza	Exp.	—	1.6	69	—	—
Joseph E. Seagrams & Sons	Baltimore Cnty., MD	Bottling plant	New	130	8	—	—	—
Joyce Foods	Clemmons, NC	Poultry processing	Exp.	36	2.3	—	—	—

FOOD PLANT SURVEY



SK Foods expanded its tomato processing facilities in Lemoore, CA. (Source: Foodpro International.)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
K								
Kahn's	Claryville, KY	Hot dogs	Exp.	–	–	–	–	–
Kangaroo Brands	Milwaukee, WI	Pita bread	New	75	3	–	–	May 1992
Karlshamns	Columbus, OH	Edible oils	New	3 acres	15	30	JLE PSI Group	Sept. 1991
Kaytee Products	Chilton, WI	Animal feed	New	–	1.5	–	–	–
Kings Hawaiian Bread	Torrance, CA	Frozen foods	New	72	3	–	–	–
Kohnan	Fairfield, CA	Sake	New	32	–	–	–	–
Kraft Food Ingredients	Albany, MN	Food products	Exp.	–	8	–	–	–
Kraft General Foods	Frederick Cnty., VA	Food products	New	135	–	200	–	–
Kraft General Foods	Atlanta, GA	Food products	New	22	1.5	–	–	–
Kraft General Foods	Springfield, MO	Cheese	Exp.	–	4	–	Sverdrup	June 1992
Kraft General Foods	Pennsylvania	Dairy	Renov.	–	–	–	Hixson	Summer 1992
Kraft Foodservice	Twinsburg, OH	Distribution	New	150	–	–	Haskell Co.	April 1991
Kraft Foodservice	Norcross, GA	Distribution	Exp.	280	–	–	Haskell Co.	Dec. 1991
Kraft Foodservice	Norcross, GA	Distribution	Exp.	700	–	–	Haskell Co.	April 1992
Kraft Foodservice	Livermore, CA	Distribution	New	195	–	–	Haskell Co.	April 1992
Kraft Foodservice	New Swickley, PA	Distribution	New	200	–	–	Haskell Co.	June 1992
Kroger Co.	Louisville, KY	Dry & Perishables	New	490	–	–	Food Plant Engineering	Spring 1993
L								
Langlois Flour Co.	Mira Loma, CA	Mixes, doughs	New	48	2.3	55	–	–
Lehigh Valley Dairies	Lansdale, PA	Dairy	Exp.	14	–	–	St. Onge, Ruff and Associates	June 1992
Leprino Foods Co.	Lemoore, CA	Cheese	Exp.	40	8	25	Webber/Smith	Dec. 1991
Liqui-Dri Foods	Louisville, KY	Biscuit mix	Exp.	–	–	60	–	–

FOOD PLANT SURVEY

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Lucky Stores	Irving, CA	Perishables	Exp.	90	8	45	Facility Group	May 1992

M

M&M Mars	Cleveland, TN	Candy	Exp.	–	100	100	–	End of 1992
Marburger Foods	Peru, IN	Food processing	Exp.	–	1.5	–	–	–
MBS	Story City, IA	Soybean seeds	New	–	3	51	–	–
McCarty Holman	Jackson, MS	Perishables	New	100	8	35	Facility Group	Aug. 1992
McCormick & Co.	Hunt Valley, MD	Food products	New	100	–	–	–	–
Meijer	Tipp City, OH	Perishables	New	217	–	–	Food Plant Engineering	Winter 1992
Meyers Bakery	Hope, AR	Baked goods	Exp.	–	1.5	100	–	–
Minn-Dak Yeast	Wahpeton, ND	Yeast	Exp.	–	–	50	–	–
Minnesota Brewery	Saint Paul, MN	Malt beverages	Exp.	–	–	75	–	Nov. 1991
Minnesota Corn Processors	Columbus, NE	Corn processing	New	–	60	–	–	Fall 1992
Mrs. Crockett's Kitchens	Fort Worth, TX	Salads	Exp.	40	4	35	Webber/Smith	Spring 1992
Monfort	Louisville, KY	Beef processing	New	–	–	600	–	–
Montgomery Inn	Cincinnati, OH	Commissary	Renov.	–	–	–	Hixson	Spring 1992
Mother's Kitchen	Burlington, NJ	Food service	Exp.	24	–	–	–	–
Musco Olive Products	Tracy, CA	Olives	Exp.	40	5	90	Foodpro Int'l.	Oct. 1991

N

Nabisco Brands	Orlando, FL	Food products	Exp.	40	1.4	–	–	–
Nabisco Foods	Indianapolis, IN	Margarine	New	300	39	180	–	Mid-1993
National Beef Packing Co.	Liberal, KS	Beef processing	Exp.	–	12	–	–	–
National Starch & Chemical	Indianapolis, IN	Starch	Exp.	–	–	–	PSI Group	–
National Sun Industries	Goodland, KS	Sunflower proc.	New	–	9	–	–	–
National Wine & Spirits Corp.	Indianapolis, IN	Bottled water	Exp.	35	3	–	–	–
Nature's Catch	Roundaway, MS	Striped bass	New	–	3	30	–	–
Neptune Fisheries	Newport News, VA	–	Exp.	26	1.6	–	–	–
Nestle Food Co.	Modesto, CA	Evaporated milk	New	125	26	60	–	–
Nestle S.A.	Atlanta, GA	Food products	New	700	–	100	–	–
Newly Weds Foods	Cleveland, TN	Breading crumbs	Exp.	135	–	120	–	–
Newport Shrimp/Talbot	Newport, OR	Fish products	New	–	2	–	–	–
Nichii Co. of America	Jefferson, IA	Soybean flake	New	29	10	–	Austin Co.	Complete
North Star Foods	Lake Mills, IA	Food processing	New	–	–	56	–	–
Normac Meats	Oklahoma City, OK	Meat	New	145	25	170	Webber/Smith	Oct. 1991
Northside Packing	Cumming, GA	Meat	Exp.	15	2	25	Webber/Smith	Fall 1992
Northside Packing	Mars, PA	Meat	Exp.	30	3	35	Webber/Smith	Fall 1992
NutraSweet Corp.	Augusta, GA	Artificial sweeteners	Exp.	–	10	100	–	–
Nutri-Flex Food Products	Madison, SD	Pea hull processing	New	–	2	–	–	–

O

Ogden Aviation	Las Vegas, NV	Airline food	Exp.	37	4.3	50	–	–
OK Foods	Heavener, OK	Poultry processing	New	–	–	130	–	–
Old Fitzgerald Distillery	Louisville, KY	Bourbon, whiskey	Exp.	–	4	–	–	–

FOOD PLANT SURVEY

A new Tropicana distribution center springs up in Jersey City, NJ. (Source: Sverdrup.)

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Ore-Ida Frozen Foods	Ontario, OR	Frozen foods	New	–	2.5	–	–	–
Orval Kent Food Co.	Vernon, CA	Chilled foods	Exp.	10	5	–	Austin Co.	–
Oscar Mayer	Kirksville, MO	Bacon	Exp.	–	–	–	Mead & Hunt	Jan. 1992
Ouachita Coca-Cola Bottling Co.	Monroe, LA	Soft drinks	Exp.	20	2.3	–	–	Spring 1992
P								
P&C Food Markets	Syracuse, NY	Grocery	New	270	14	60	Webber/Smith	Summer 1993
Paul Shipman	Seattle, WA	Brewery	New	–	18	–	–	Late 1993
Pekin Energy Co.	Pekin, IL	Ethanol	Exp.	–	20	–	PSI Group	Aug. 1991
Perdue Farms	Dillon, SC	Poultry processing	New	–	25	300	–	–
Pestritto Foods	Bakersfield, CA	Frozen dough	New	20	–	125	–	–
PetsMart	Ennis, TX	Pet food	New	117	–	100	–	–
PFP	Valley City, ND	Finished foods	New	30	–	–	–	–
Ph. Orth Co.	Spartanburg, SC	Baker's ingredients	New	44	–	–	–	–
Philadelphia Macaroni	Grand Forks, ND	Pasta	New	40	–	–	–	–
Philadelphia Port Authority	Philadelphia, PA	Fruit storage	Renov.	90	–	–	St. Onge, Ruff and Associates W.F. Spiegel	1992
Pizza Hut	Wichita, KS	Hand-made pizza	Exp.	54	2.5	120	–	April 1992
Port of Seattle	Seattle, WA	Warehouse	New	70	7	25	Webber/Smith Reid-Middleton	Spring 1992
Port of Everett	Everett, WA	Warehouse	New	30	3	10	Webber/Smith John Graham Associates	July 1992
Portioned Meats	Mandeville, LA	Meat	New	20	2	30	Webber/Smith	–
Price Chopper Smkts.	Schenectady, NY	New	Dairy	26	1.2	–	St. Onge, Ruff and Associates	
Publix Supermarkets	Deerfield Beach, FL	Perishables	Exp.	420	–	–	Food Plant Engineering	–
Purina Mills	Orrville, OH	Animal feeds	New	–	5.2	–	–	–
Q								
Quaker Oats	Louisville, KY	Food processing	Exp.	170	25	130	Haskell Group	March 1991
Quincy Farms	Quincy, FL	Mushrooms	Exp.	100	7.2	100	–	–
R								
R.M. Palmer Co.	Exeter, PA	Chocolate	New	165	–	–	–	March 1992

FOOD PLANT SURVEY

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Raleys	Sacramento, CA	Perishables	New	285	—	—	Food Plant Engineering	Summer 1992
Rangen	Angleton, TX	Fish feed	New	—	5	—	—	—
Ralston Purina	Memphis, TN	Soy protein	New	—	50	—	PSI Group	April 1991
Red Wing Co.	Fredonia, NY	Food products	Exp.	—	8.5	—	—	—
Reedsburg Foods Corp.	Reedsburg, WI	Frozen vegetables	Exp.	—	2.5	—	—	Aug. 1991
Richmond Cold Storage	Richmond, VA	Distribution center	New	75	6	40	Haskell Group	Jan. 1991
Rocco Turkey	Rockingham County, VA	Turkey	New	110	10	45	Facility Group,	June 1992
Rosenberger Cold Storage	York, PA	Refrigeration	Exp.	80	2	20	Webber/Smith	Aug. 1991
Roth Kase USA Ltd.	Monroe, WI	Cheese	Exp.	—	3	—	—	—
Ruiz Food Products	Dinuba, CA	Mexican food	New	200	—	—	—	March 1991
Russell Stover Candies	Carmel Church, VA	Candy	New	90	5	30	Facility Group	March 1992
Ryan Milk	Murray, KY	Dairy products	Exp.	—	2.2	—	—	April 1992

S

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
SK Foods, Inc.	Lemoore, CA	Tomato paste	Exp.	24	4	140	Foodpro Int'l.	June 1991
Sage Enterprises	Hauppauge, NY	Distribution center	Renov.	30	—	—	St. Onge, Ruff and Associates	1993
San Benito Foods	Hollister, CA	Food canning	New	400	—	—	—	—
Sargento Cheese Co.	Plymouth, WI	Cheese processing	Exp.	60	—	—	—	July 1992
Sauer, C.F. Company	Mauldin, SC	Mayonnaise	Exp.	—	4	—	—	—
Savannah Cocoa	Savannah, GA	Cocoa bean	New	—	—	50	—	Sept. 1991
Schenley Distillers	Louisville, KY	Bourbon	Exp.	—	20	—	—	—
Scrivner	Montgomery, AL	Food products	New	80	—	—	—	Oct. 1991
Scrivner	Buffalo, NY	Distribution center	Exp.	30	—	10	Webber/Smith	Fall 1991
Seneca Foods	Janesville, WI	Vegetable proc.	Exp.	175	—	—	—	—
Sheridan Extrusion Co.	Sheridan, WY	Pet food/fish	New	20	2.4	—	—	May 1992
Showa Sangyo Co., Ltd.	Portland, OR	Frozen vegetables	New	—	14.6	—	—	—
Smith Frozen Food	Weston, OR	Dry	New	30	—	—	Food Plant Engineering	Fall 1992
Smith Frozen Food	Weston, OR	Frozen food	Exp.	102	—	—	Food Plant Engineering	Fall 1991
Smith Dairy Products Co.	Orrville, OH	Dairy products	New	—	5.6	—	—	—
Smithfield Foods	Tarheel, NC	Pork	New	—	50	500	—	Sept. 1992
Snyders	Hanover, PA	Pretzels	Addition	40	25	—	—	Summer 1992
So-Pak Co.	Mullins, SC	Military food	Exp.	28	—	—	—	—
Springwater Cookie Co.	Springboro, OH	Cookies	New	102	—	—	—	Late Summer
Steuben	Buffalo, NY	Cultured products	Renov.	—	—	—	Hixson	1991
Stokely USA	Wells, MN	Vegetable proc.	Exp.	—	3.1	—	—	—
Stroehmann Bakery	West Hazleton, PA	Fresh breads	Exp.	47	—	100	—	1992
Sunlight Foods	Lakeland, FL	Food products	Exp.	27	—	—	—	—
Swift-Eckrich	Saint James, MN	Cold cuts	Exp.	—	2	70	—	—

T

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
T.G. Lee	Plant City, FL	Dairy products	Exp	—	—	150	—	—
Taggart & Taggart Soybean	Augusta, AR	Soybean processing	New	—	3	—	—	—

FOOD PLANT SURVEY

Company	Plant Location	Primary Product	Type Project	M Sq. Ft.	Est. Cost ($ millions)	Employ-ees	Architects/ Engineers	Status & Date
Tatsuuma-Honke Brewing Co.	Golden, CO	Sake brewery	New	61	7	–	–	–
Teepak	Swansea, SC	Edible meat casings	Exp.	20	10	–	–	–
The Western Dairymen Coop.	Amalga, UT	Cheese	Exp.	–	5	–	–	–
Thomas J. Lipton Co.	Independence, MO	Instant tea	Exp.	–	1.3	60	–	–
Thomas J. Lipton Co.	Independence, MO	Salad dressings	Exp.	–	13	60	–	–
Tombstone Pizza Corp.	Sussex, WI	Frozen pizza	Exp.	72	–	–	–	–
Tone Brothers	Des Moines, IA	Spices, vegetables	Exp.	30	4	–	–	–
Trauth Dairy	Newport, KY	Dairy	Exp.	30	–	–	Hixson	1991
Tropicana	Fort Pierce, FL	Frozen citrus	Exp.	–	10	100	–	–
Tropicana Products	Fort Pierce, FL	Frozen citrus	New	127	–	–	–	–
Tropicana Products	Jersey City, NJ	Distribution center	New	210	60 +	–	Sverdrup	–
Tyson Foods	Nashville, AR	Poultry processing	Exp.	–	5	100	–	–
Tyson Foods	Garland, TX	Meat processing	Exp.	28	3	–	–	–

U

United Maize	Cambria, WI	Grits, flour	New	23	1.1	–	–	–
UB Foods U.S.	Oxford, PA	Snacks	Exp.	15	–	–	Epstein & Sons	Nov. 1991
U.S. Army Corp. of Engrs.	Annville, PA	Foodservice dist.	New	50	–	–	St. Onge, Ruff and Associates	1993

V

Vacu-Dry	Sebastopol, CA	Dried fruit	Exp.	30	–	–	Food Plant Engineering	Fall 1992
Van Melle	Florence, KY	Candy	Exp.	–	7.5	–	–	–
Van Melle	Covington, KY	Candy	New	52	6	–	–	–
Verdelli Farms	Hummelstown, PA	Vegetables	New	62	4.7	250	St. Onge, Ruff and Associates	May 1992
Vita-Pakt	Lindsay, CA	Marmalade	New	60	–	80	–	–

W

Warner-Jenkinson	St. Louis, MO	Food dye	New	28	8	12	Fru-Con Engr.	April 1991
Wayne Farms	Laurel, MS	Poultry proc.	Exp.	70	6	40	Facility Group	Feb. 1992
Wells Blue Bunny Dairy	Le Mars, IA	Ice cream	Exp.	175	24	245	–	–
Western Sugar Co.	Scottsbluff, NE	Sugar processing	New	–	36	–	PSI Group	July 1992
WestPac	Lathrop, CA	Dry grocery	New	658	–	–	Food Plant Engineering	Summer 1992
White Castle Distributing	Covington, KY	Hamburgers	New	30	5	100	–	–
Whitlock Packaging Corp.	Fort Gibson, OK	Fruit juice	Exp.	78	–	100	–	–
Wilson Products Company	Salt Lake City, UT	Mexican food	Exp.	38	2.3	–	–	–
Winn Dixie Stores	Fitzgerald, GA	Food and beverages	New	–	–	300	–	–
Wisconsin Dairies Coop.	Waumandee, WI	Cheese	Exp.	15	1	–	Mead & Hunt	July 1991
WSMP	Claremont, NC	Rolls, biscuits	Exp.	45	5.5	120	–	–

Z

Zapata Haynie	Abbeville, LA	Fish and oil	Exp.	–	6.7	–	–	–

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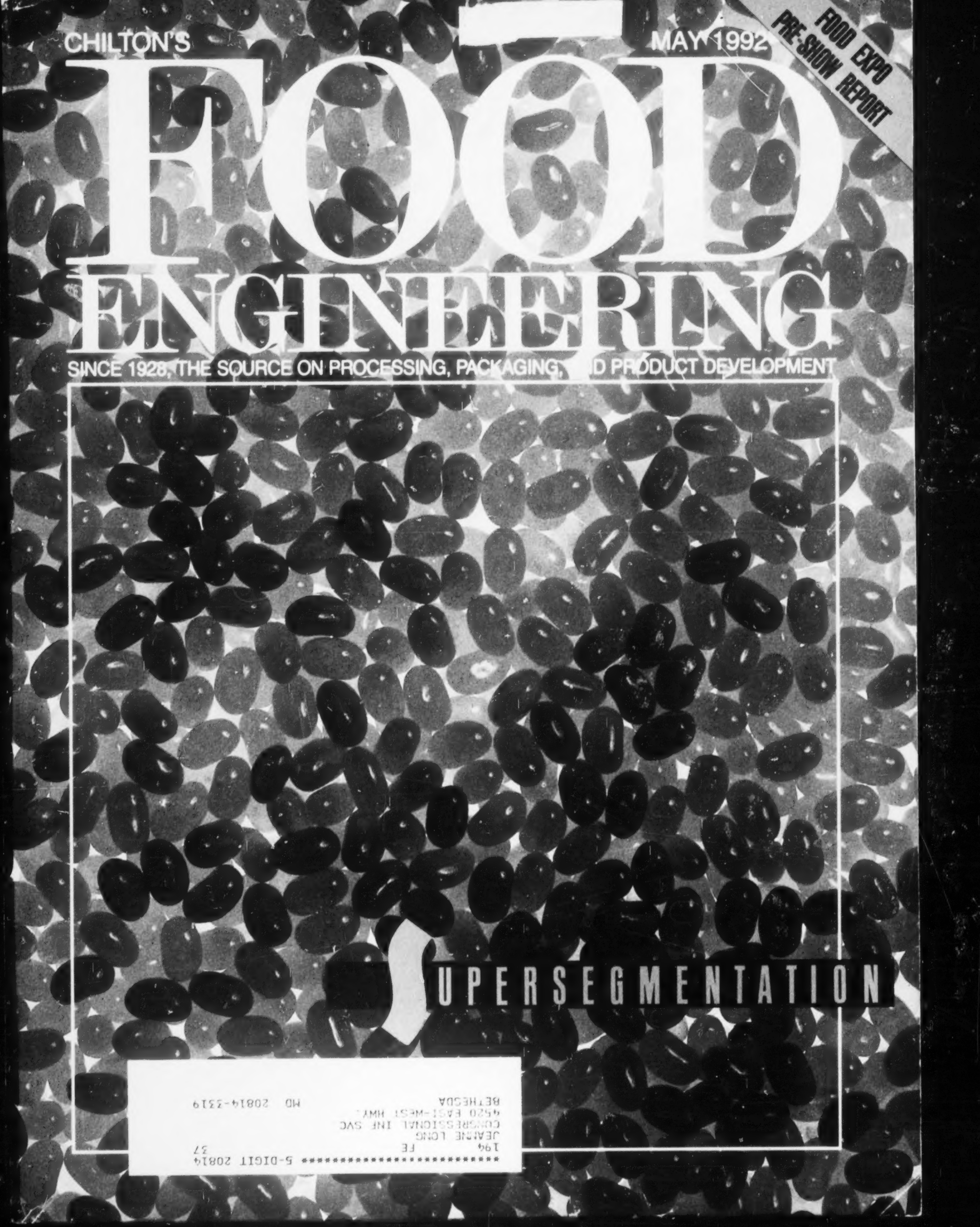
FOOD EXPO PRE-SHOW REPORT



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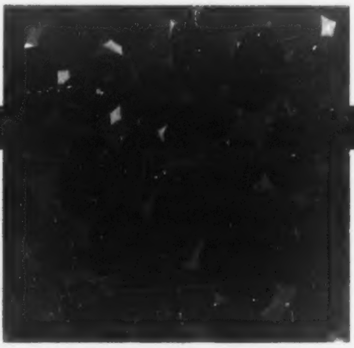

ABOUT THE COVER

Supersegmentation, the wave of the future, is the ability, at both production and retail levels, to address the special food needs of the individual store or even the individual customer—a red jelly bean lover, for example.
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SPECIAL EMPHASIS

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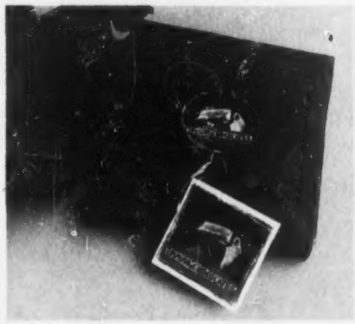

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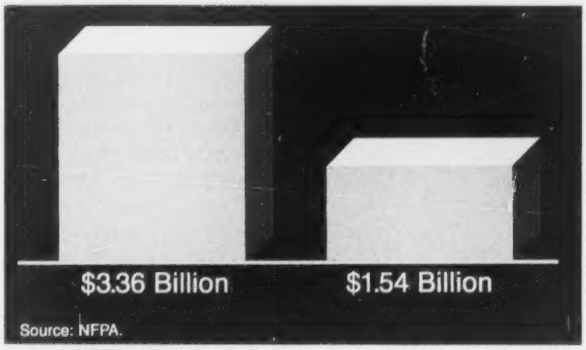
INDUSTRY REPORT

No extension of NLEA deadline expected

Food and Drug Administration (FDA) Commissioner David Kessler said the FDA will meet the deadline to complete its proposals under the Nutrition and Education Labeling Act (NLEA), as he addressed the Food Policy for Health and the Environment conference sponsored by Public Voice for Food and Health Policy in cooperation with the National Food Processors Association (NFPA). Another speaker, Rep. Richard Gephardt, also expressed opposition to an extension. This repudiated rumors in the food industry that predicted the FDA would fail to meet the November deadline. Implementing **the NLEA will cost the food industry $3.36 billion,** according to the latest numbers from the NFPA. This conservative figure reflects the costs of full nutrition analyses, additional equipment and technical personnel, preparation work for labels, including artwork, layout, stripping, color separations and film preparation as well as the actual reprinting of labels, according to the NFPA.

The NFPA is requesting the FDA to extend the effective date to May 1994. The group further noted that the analytical methods required by the FDA to comply with the proposed NLEA are often inadequate or do not exist.



Source: NFPA.

Latest NFPA estimates of the costs to implement the NLEA versus FDA estimates (r).

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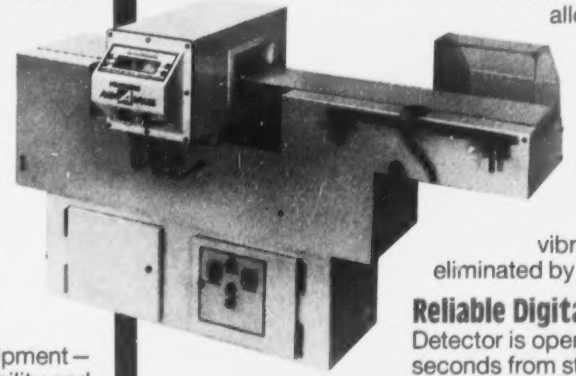

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INGREDIENT BUYERS SURVEY

Food manufacturers struggle with expected NLEA regulations while still trying to market foods to a health conscious market.

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR

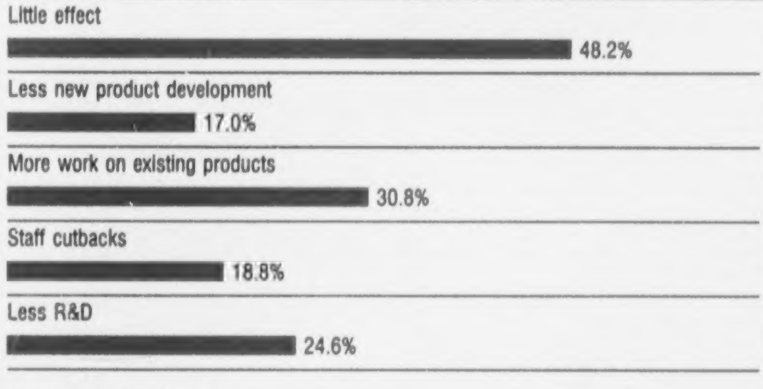
Devising truly new products, reducing the amount of fat in foods and being able to advertise that fact under the new labeling regulations are the chief concerns of those who participated in our annual *Food Engineering* Ingredient Buyer Survey. The coming Nutritional Labeling and Education Act (NLEA) is severely limiting the use of nutrient descriptors—a serious handicap considering low-fat is a prime selling point in today's health conscious market. One seafood manufacturing head wonders if the industry will soon be fighting a nutritional labeling war as companies scramble to reformulate their products to meet the regulations of the NLEA.

Some 49 percent of those surveyed said reducing the amount of fat was a major factor in new food product development. Interestingly, both marketing and R&D were equally the greatest force behind the drive for fat reduction, with more than half selecting low-fat development as a high priority. In terms of industry segments, the fats and oils manufacturers were the biggest champions of low-fat research. Perhaps because their products are perceived as being culprits for containing high levels of fat, seventy-one percent of the fats and oils manufacturers listed fat reduction as an important goal. They may find salvation yet, in the guise of synthetic fat replacers, with 46 percent of the fats and oils manufacturers planning to increase their use of *Simplesse, Olestra,* etc.

While cutting fat levels was a significant concern for all industries, cutting saturation levels of fats didn't garner as much interest with only 30 percent citing it as a major concern. Perhaps simply removing fat from the label was more of a priority.

While cutting fat continues to drive food formulation efforts, reducing other values is taking a backseat. Only 41 percent cited cutting calories as a

The Panel Cites Recession's Effect on Product Development



Source: Food Engineering's Ingredient Survey 1992.

The Fat Frenzy

Most of the food companies surveyed anticipate the Nutritional Labeling and Education Act (NLEA) will seriously hamper the marketing of 'healthy' foods. By and large, in verbatim replies to *FE*'s survey, some one third of the respondents lamented the fact that their low- and reduced-fat claims would have to be changed.

With all the attention the new regulations give to fat, plus the public's increasing concern with fat, formulations will be approached with the idea of minimizing the fat content," said an East Coast vice president of product development. Food companies worry that sales will be hurt once "consumers are advised of (a product's) true fat content," noted a Midwest food engineer.

It seems everyone wants to fit on the low-fat bandwagon. It has even reached the point where a chocolate manufacturer questions how he will label a pound of assorted chocolates.

As a speaker at a recent industry conference said, is it really necessary that *ALL* foods parade about with low-fat labeling? Isn't it ridiculous that all foods are trying to fit into the same svelte fat-free label?

For years marketers have been pointing to the fact that in the frenzy to watch fat intake, sales of indulgent treats such as gourmet ice cream have not faltered. With the availability of fat-free, no-cholesterol salad dressing, has the market for regular dressings collapsed? Take a look at the supermarket shelves to find out. Some markets boast of two full facings of salad dressing with perhaps two or three rows of lite dressings. Meanwhile, dust is *not* accumulating on regular varieties of salad dressings, signifying that somebody is still buying them.

Perhaps all this data on what consumers say they buy and what they really do buy deserves a more critical look. Think about the last social affair you've attended. While it's become socially unacceptable to have dessert without beating one's breast about it, notice good desserts always disappear. Perhaps the pollsters can come up with a better way to find out what people really eat and food marketers won't feel obligated to make health claims about everything we eat. Only then will sanity return to the marketplace.

The Panel Rates the Factors Having a Major Effect on R&D

Positive effect	
Demand for truly new products	60.7%
Cooperation between food companies and suppliers	49.6
Formulations for health conscious consumer	54.5
Interface between R&D/Manufacturing	50.9
Wider selection of ingredients	36.2
Formulations for changing processing requirements	32.6
Line extensions/me-too products	36.6
Low cost/high quality in balance	43.8
Consumer ingredient safety concerns	28.6
Negative effect	
Increased workload for R&D personnel	28.6
Tighter R&D budgets	32.6
No effect	
Computerization/automation of lab procedures	38.8
QC responsibility placed on R&D people	37.1
Food company mergers	51.3
Supplier company mergers	47.3
New formulations for new packaging	42.0

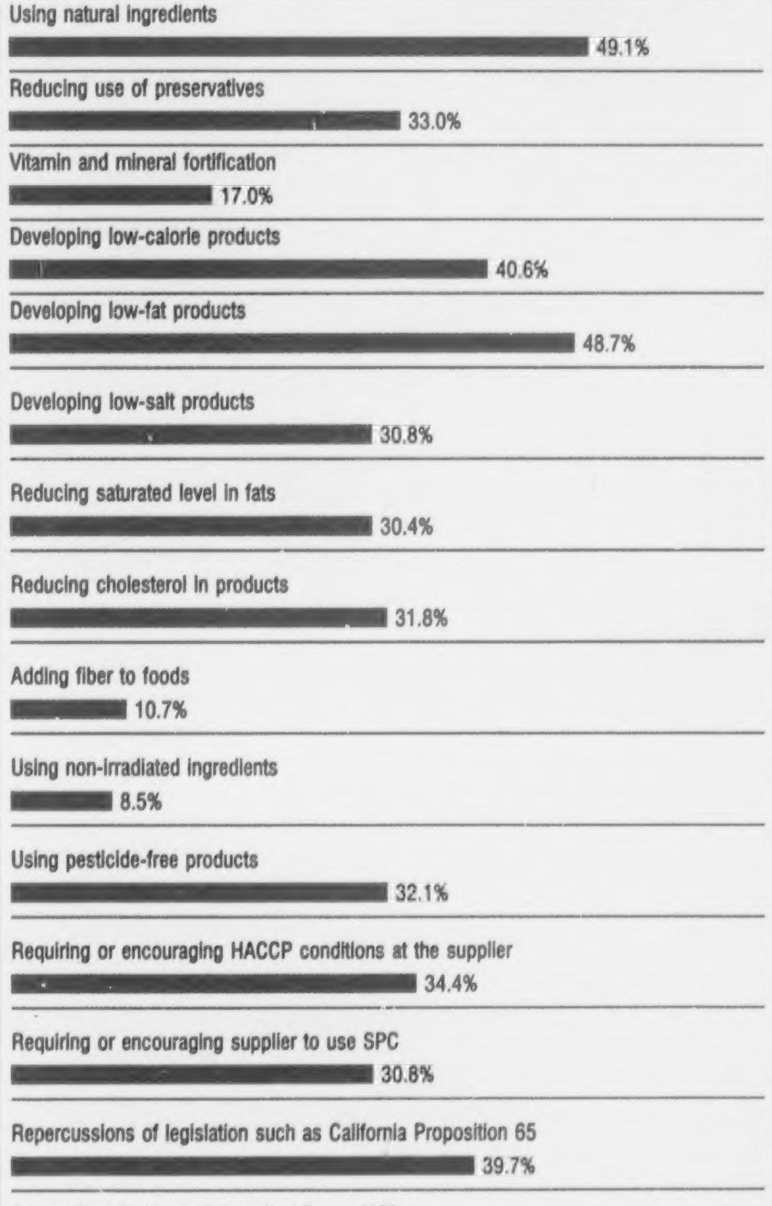
Source: Food Engineering's Ingredient Survey 1992.

formulation priority, and sodium and cholesterol reduction was considered vital by only 31 and 32 percent respectively.

Since the NLEA regulations will be announced in November and will go into effect May 8, 1993, they have become a major preoccupation for the food industry. The NLEA was mentioned throughout *FE*'s Food Ingredient Buyers Survey, even in response to questions not specifically asking about it. This is easy to understand since the regulations are going to have a huge impact on business. The latest estimate of the cost to implement the law in the first year alone approaches $3.36 billion, according to the National Food Processors Association (NFPA). "Labels and packaging will be changed. A large expense will be experienced in order to run assays on all products we make in order to meet requirements for nutritional labeling," said a food technologist for a well-known meat company.

Two of the areas held most in contention between the food industry and the Food and Drug Administration (FDA) is use of nutrient descriptors and serving sizes. When asked

The Panel Lists Major Influences on Product Development



Source: Food Engineering's Ingredient Survey 1992.

specifically, how the proposed labeling regulations will affect a product or formulation, one panelist responded: "In the interpretation of low-fat, low-calorie, fats (saturated versus unsaturated), etc." One company expects to eliminate its low-salt line of products since it is unable to meet the new regulations. Another frustrated bakery plant manager, anticipates, "Not being able to make any claims, so there will be little difference between good for you and perceived good." Many anticipate increased workhours and an overload of paperwork to track down labeling of ingredients from suppliers.

Serving sizes as stipulated by the NLEA are another area of contention. Nutrient descriptors will have to meet specific requirements simultaneously in weight and in per serving—which for some products is proving to be impossible. "Reformulation will be required to reduce fat and sodium levels, which will change the product's density and resulting serving size," according to a project leader for a huge processing firm. "The serving size increases from six to eight ounces for canned beverages, which will require all new nutritional labels," added a product development head at an influential food company. "Labeling changes will require redesign of packages and their labels," summarized a West Coast technical director.

Once overcoming the shock of adapting to the NLEA, most panelists agreed that the life blood of any company is its ability to produce truly new products—close to 61 percent of our panel cited it as effecting R&D. Some 73 percent of companies employing more than 500 employees agreed that new product development was a significant goal, compared to 52 percent of those employing less than 100. Happily, there was only a discrepency of five percent between responses given by management and R&D to the question asking about corporate emphasis on new products. Sometimes various departments within companies pull in different directions, but at least panelists from both departments agreed on this one issue.

It was a big surprise to see almost half of our panelists say that the recession had little if any effect. However, close to a third said there has been more work on existing projects and an

INGREDIENT
BUYERS
SURVEY

Playing Nostradamus

Respondents have the most fun playing fortune teller when we ask them to predict future innovations. Responses run from the predictable, such as the desire for better fat replacements, to the bold, such as the call that some day consumers will prefer irradiated products to insure food safety and extend shelf life.

Our panel's wish list for the perfect fat replacer includes: fat replacers for frying snack foods, artificial fat to replace fat in meat, chemical control of fats once they are absorbed by the human body, better fat mimetics, to simply better tasting fats. One realist declared, "There are no magic fat replacers. R&D scientists will need to use their own imagination to develop low-fat food alternatives."

Even looking toward the future, labeling casts a shadow across the food manufacturer's mind. "Labeling issues will dramatically affect the types of products available. Reduced fat, lower salt, etc. will cause consumers to see food more as good and bad, which forces food companies to strive to overcome this misconception," lamented the manager of product development for a major food company.

More breakthroughs are expected in the prepared foods front. Complete dinners will be reconstituted any place consumers are on the run—including in the car, according to a Northeast CEO. Microwavable packaging and more packaging aimed at foodservice establishments will further boost the ready-to-eat market. Convenience foods at a lower price, was predicted by several panelists. There must be "a continuance of shelf stable foods. Working families need convenience, such as deli takeout. Those who feel the economic crunch will look for value," said a milk sales manager. "Fresh shelf stable snacks will be the new rave," according to said a California R&D manager.

Finally, pharmafood—foods consumed for specific health benefits will become even more in vogue. Vegetarian foods will become more acceptable to consumers, according to one vice president of R&D.

"The healthy trend will continue. A major breakthrough would be the development of natural colors that are heat stable," said an ingredient supplier.

The Panel Rates R&D Priorities

	Low	Moderate	High	Top
Meat	9.0%	41.8%	38.8%	10.4%
Bakery	12.5	35.9	39.1	12.5
Dairy	9.2	32.3	40.0	13.8
Flavors/Ingredients	12.5	29.7	43.8	10.9
Canned	6.9	58.6	20.7	13.8
Fats/Oils	24.4	29.3	34.1	9.8
Frozen	3.0	45.5	39.4	12.1
Confectionery	10.3	35.9	46.2	7.7
Cereal	13.0	27.8	42.6	14.8
Beverages	15.2	30.3	42.4	6.1

Source: Food Engineering's Ingredient Survey 1992.

additional 25 percent said less money is being pumped into R&D (multiple answers were given). While significant numbers voiced concern about having to pick up the slack from staff reductions, only four percent worried about their facility closing (compared to two percent last year).

The renewed emphasis on quality programs is evident as 44 percent said their companies expect costs to be kept down while increasing quality. One of the most frequent ways to pump up quality was to enlist the aid of suppliers, as evidenced by close to half the panel saying increased cooperation is occurring between food companies and their suppliers in the areas of R&D.

Once considered only a pipedream, there appears to be real cooperation between various departments within food companies. Nearly half praised the increased cooperation between R&D and engineering departments. One head of engineering went as far to say that, "Division between R&D and manufacturing engineers will disappear in progressive companies. Engineering will support R&D and manufacturing to shorten the development cycle."

Increased cooperation is also a significant agent in the "ever increasing fast track development," according to a technical director from the Pacific Northwest. "Full cooperation of all

INGREDIENT BUYERS SURVEY

Ingredient Levels Which the Panel Plans to Increase Use

Acidulants	10.7%	MW flavors	13.8%
Antioxidants	8.5	Natural flavors	41.5
Cheese	18.8	Yeast-derived flavors	12.5
Colors	8.9	Gums	25.0
Dairy proteins	21.4	Mineral supplements	9.8
Dehydrated products	15.6	Protein isolates	14.7
Emulsifers	14.7	Salt	4.5
Enzymes	14.3	Seasonings	25.4
Fats/oils	12.5	Stabilizers	13.8
Fiber	20.1	Starches	19.6
Flavor enhancers	22.3	Sweeteners	7.1
Artificial flavors	9.4	Low-cal sweeteners	24.1
Fat replacers	26.3	Sucrose, fructose	13.4

Source: Food Engineering's Ingredient Survey 1992.

The Panel Lists Effects of Proposed Labeling Regulations

	Little or no effect	Significant effect
Meat	59.7%	40.3%
Bakery	50.0	45.3
Dairy	60.0	35.4
Flavors/ ingredients	53.1	40.6
Canned	62.1	37.9
Fats/Oil	46.3	43.9
Frozen	57.6	39.4
Confectionery	59.0	30.8
Cereal	55.6	40.7
Beverages	54.5	45.5

Source: Food Engineering's Ingredient Survey 1992.

participants in development (purchasing, engineering, manufacturing, R&D, QA) reduces turf issues and surprises. The result is sped-up development, faster manufacturing time and improved efficiency and effectiveness."

In the market, the health conscious consumer continues to impact food company buying decisions. More than 70 percent of the panel reports that formulating for an increasingly health-conscious consumer is a top priority. Close to 60 percent say they are taking advantage of the increased variety of ingredients to meet this demand. Some of the most common comments include the desire to find replacements for ingredients that consumers have interpreted as being "bad" such as fat, salt, calories, and MSG. One company is involved in replacing the chemical-sounding names of ingredients to improve customer perception.

Besides cleaning up the label, one advantage of cutting the amount of fat and oil in certain foods is that a lower level of antioxidants can be used. This boosts the use of natural antioxidants which, according to a process development manager, enhances product quality and shelf life. Reducing or lessening the amount of preservatives is a major concern of one third of the panel. Most of the drive to eliminate preservatives comes from the packaging department which sees its own technology as a replacement for preservatives. Across industry lines, the greatest desire to cut the use of preservatives comes from the canning industry, with 48 percent calling the lessening of preservatives an important goal.

The impact of California Proposition 65 has been strong, with 40 percent saying that it had significant influence on product development decisions. "Many items on California Prop 65 are natural parts of raw grains, making it almost impossible to live with," said the president of a milling company, referring to the legislation that requires labeling of any residues of substances that are carcinogenic or mutogenic.

With the introduction of more organic foods, more ingredient buyers are shopping for pesticide-free foods. This year one-third of our panelists indicated a desire to buy pesticide-free ingredients, an increase from last year's marginal interest. Food safety also remains as an important issue with twenty-nine percent of our panelists saying they will steer clear of ingredients mired in controversy.

Some 42 percent projected an increased demand for natural flavors, with the bulk being used by vegetable and fruit canners and makers of entrees. "Plans call for reformulating products to use natural in place of artificial flavors," said the manager of food technology at an ice cream company. Natural flavors also improve flavor and stability in the packaged product, according to a vice president of R&D. Twenty percent want to reduce the use of artificial flavors.

The *Food Engineering* Ingredient Buyer Survey is available for $150. Call Anne Hartnett at (215)964-4444 or fax to her attention at (215)964-4273. ▲

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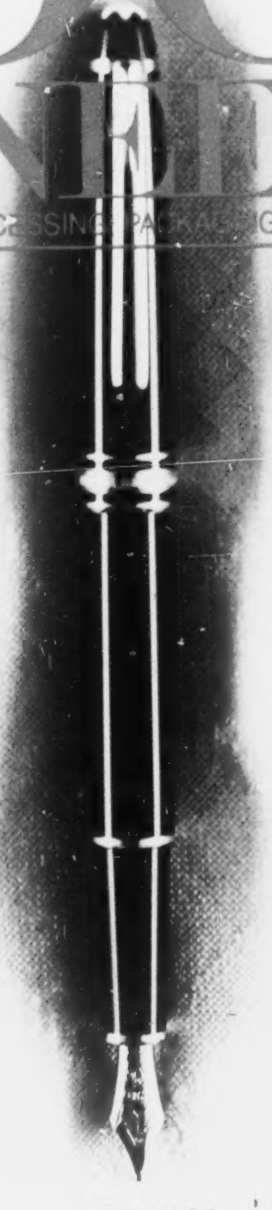

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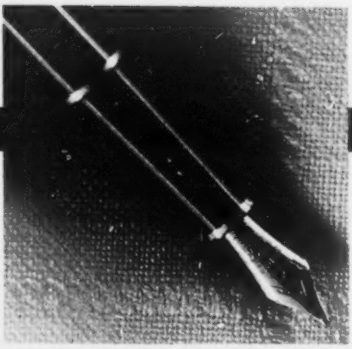

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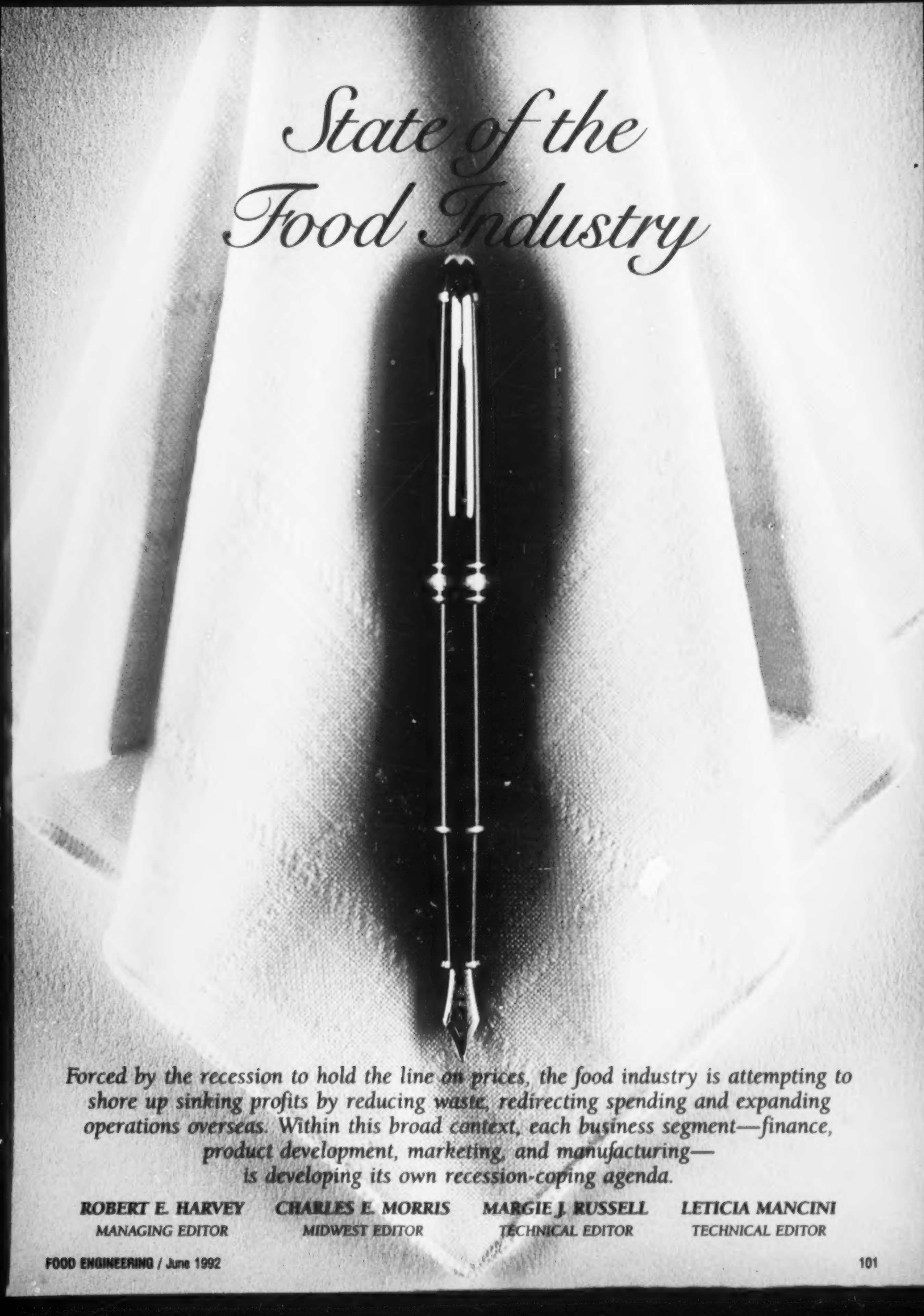
State of the Food Industry



Forced by the recession to hold the line on prices, the food industry is attempting to shore up sinking profits by reducing waste, redirecting spending and expanding operations overseas. Within this broad context, each business segment—finance, product development, marketing, and manufacturing—is developing its own recession-coping agenda.

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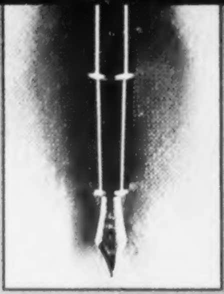


STATE OF THE FOOD INDUSTRY

Finance

One fact is crystal clear: this country is mired in a recession. Much less clear, however, is the relationship between this recession and the food industry. When asked to gauge the recession's impact, answers from industry officials ran the gamut from "none" to "severe."

The relationship is foggy for several reasons:

•First, the recession's effect on food companies has been capricious. Some firms claim that business has never been better, while others are singing the blues. A scattershot recession makes generalizations difficult.

•Second, it is difficult to separate the recession's impact from numerous other forces. For example, is a company's unexpectedly poor financial showing primarily the result of the recession, simply poor management, extensive debt or, possibly, just the returning to earth of mature business after a decade of overachievement?

"My sense is that people are attributing problems to the recession, even when not warranted," says David Rabinowitz, analyst with Kidder, Peabody & Co., New York City. "It is a convenient thing to blame."

•Third, the very arbitrariness of this recession has left its effects open to diverse interpretations. Despite differing opinions, however, certain general observations are possible.

"It's a recession where you don't see huge declines or losses," says William Leach, financial analyst with Donldson Lufkin & Jenrette, New York City. "Companies that had very good earnings prior to the recession were growing at almost 15 percent a year [11 percent in 1991]. Recent results, however, show earnings up on average of only 5 or 6 percent."

Of the 15 biggest food companies Leach tracks, profits for the year are up about eight percent—a mild slide but no disaster. More disturbing, however, is the fact that many of those companies "...have negative sales trends, actual declining revenues, caused by a combination of lackluster volumes, pricing problems, and generally negative foreign exchange rates," he noted. "If you look at Heinz or Borden or Ralston, ConAgra, Kraft an Phillip Morris, they have actually had down revenues."

While stalled domestically, companies have been able to pickup some business through aggressive expansion overseas. Micheal F. Pasquale, Hershey Foods' chief financial officer, sees rapid expansion in Europe as central to his firms's strategy.

Recessionary benefits

While the recent drops in revenues have elicited deep concern by some, others view these worriers with some skepticism.

"In fact it seems to me that in some ways, the recession has been positive," suggests Richard Elam, equity analyst with the Kemper Securities Group, Chicago. "We have seen labor and packaging costs either decline or remain stable." Also raw material costs have remained low, he observes, including sugar, corn sweeteners, almost all grains, and vegetables.

Even debt levels have been less of

Number of Food Companies Raising/Lowering Budgets[1]

	Raising	Lowering
Marketing	67	70
R&D	56	65
Automation	58	77
Salaries	31	106

[1] Out of 231 companies surveyed.

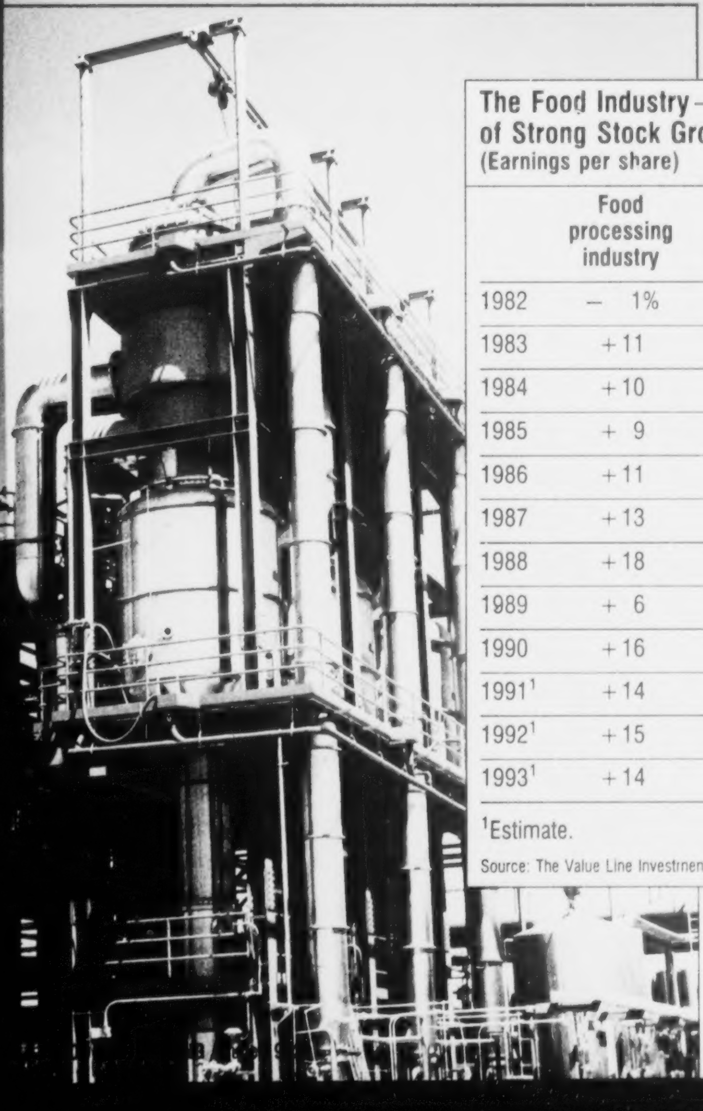
Source: FE Executive Advisory Panel

a concern than expected. While U.S. food retailers and manufacturers are have been among the most leveraged industries in the country, debt levels in both 1990 and the first half of 1991 rose only slightly, reported USDA.

While some downplay the recession's effect, others assert that the food industry in general, and certain segments in particular, have been hurt more than is readily apparent.

Roger Spencer, an analyst with Painewebber, Inc., in Chicago, suggests that among the hardest hit segments are those aswarm with private label products or with new players. For example, the recession's impact in the cheese segment (where private label brands take a back seat only to Kraft in the volume of cheese sold), has been damaging.

"In Kraft USA's retail cheese division, we were hit by unprecedented volatility in cheese costs," reported Michael A. Miles, Chairman and CEO of Philip Morris Companies, Inc. to the Consumer Analyst Group of New York (CAGNY). "Following three years of generally upward pressure, commodity costs declined to government support levels. Retailers used these low costs to aggressively price and merchandise private label products, resulting in volume and share erosion for Kraft."



The Food Industry—A decade of Strong Stock Growth

(Earnings per share)

	Food processing industry	Industrial composite
1982	– 1%	–23%
1983	+11	+14
1984	+10	+23
1985	+ 9	– 5
1986	+11	– 8
1987	+13	+34
1988	+18	+22
1989	+ 6	–
1990	+16	–10
1991[1]	+14	–24
1992[1]	+15	+14
1993[1]	+14	+26

[1] Estimate.

Source: The Value Line Investment Survey.

The resurgence of private labels indicate that the consumer has become more cost conscious in his food buying habits and less apt to buy high value-added products. This increased frugality is born out by USDA figures which indicate that in 1989, consumer spending on food rose nearly six percent from the previous year. In 1991 that percent rise was only slightly more than three percent.

Trading down by consumers has particularly hurt those companies that sell specially items. But even those companies with a broad range of products are being squeezed by customers looking for low margin foods. Trading down has hurt product development as well.

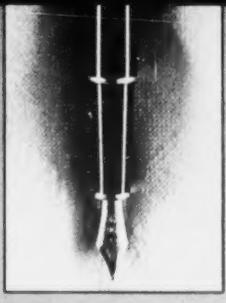
"I think it is a better industry than it was 15 years ago because it is selling a lot less commodity flour and more cake,"said John M. McMillin, analyst with Prudential Bache Research, New York City. "They are making more per dollar of sale: building a better brand. But in the current environment no one is has really wanted to pay up for anything." This unwillingness to spend money, this return to the basics, has halted a good deal of interesting food developments—like microwaveable single-dish vegetables and microwaveable bacon, he asserts.

The consumers' unwillingness to buy higher margin products, plus deeper discounting on grocery shelves, is causing companies with seemingly healthy production volumes to experience sharply reduced profit margins.

Pricing problems

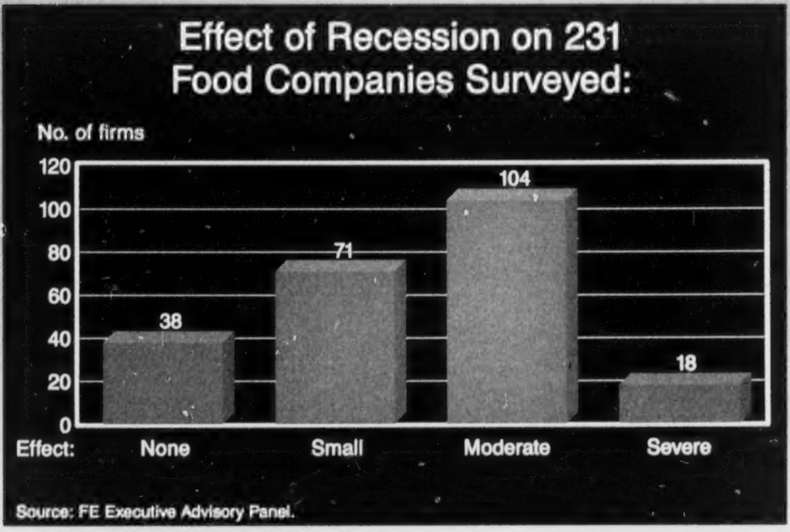
"I think in general, the industry has suffered much more price erosion perhaps than they have in other recessions; the inability to price in this recession has hurt." reported Ronald B. Morrow of Smith Barney, Harris Upham & Co., New York City.

Unable to raise prices, companies are attempting to make ends meet by cutting costs—these cost reduction measures are taking a variety of forms—reducing the payroll, for ex-



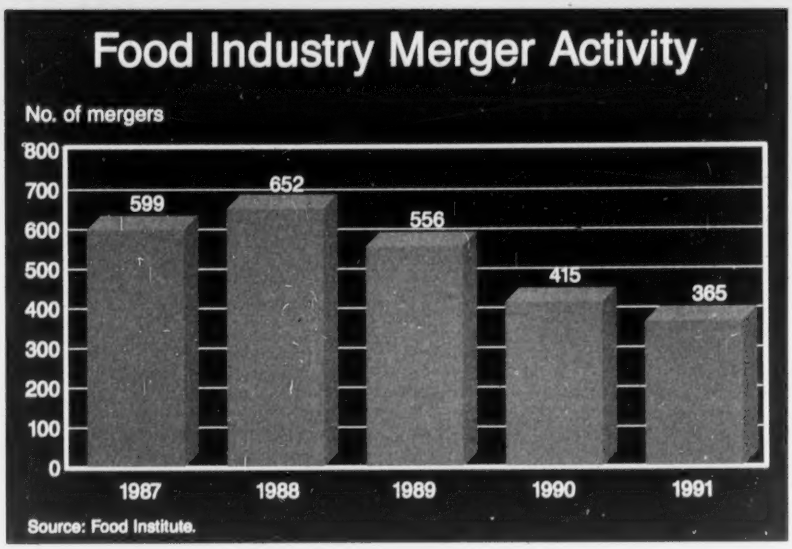
ample, or slashing media advertising, or attempting to eliminate production inefficiencies.

"They are all trying to get to be more efficient managers of the whole system, from buying product from the farm or the elevator, to minimizing inventory, to just-in-time (JIT) delivery.... It seems to me the heat is really on to take costs out of the whole processing arena," points out Spencer.



Effect of Recession on 231 Food Companies Surveyed:

Source: FE Executive Advisory Panel.



Food Industry Merger Activity

Source: Food Institute.

Besides increasing efforts to cut costs by reducing waste, improving production efficiencies, and streamlining the workforce, the food companies are attempting to become more competitive at the retail level by keeping R&D budgets high, doing more product discounting, and spending more on promotions. The downside of this approach is that with so much emphasis on competing more effectively in the present, food companies could be mortgaging their future.

"Some of the companies in the fourth quarter basically eliminated media spending," points out Donaldson Lufkin & Jenrette's Leach. "My view, however, is that promotions are just price cuts; they don't build brand loyalty for more than about 15 minutes." (For an opposing view see *Marketing* segment.)

The inability to gain profits through pricing, has intensified competition not only among food processors but between processors and retailers as well. Areas of contention are: who will assume the costly chore of holding the inventory and how will promotional costs be divvied up.

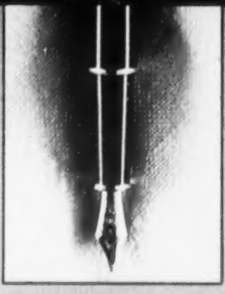
Amid these mounting problems, however, evidence is growing that the recession is easing. "We are starting to some price improvement, but it is very early," said Morrow. "The second quarter will be a difficult one, then we will start to see improvements in the third and fourth."

If the recession does ease, the next question is: Will it have any lasting effects? Leach, for one, believes that many of the problems which were brought to a head by the recession, will remain after it has faded.

"I think that the bottom line is that these food companies won't be ten or 15 percent growers any more," said Leach. "I think the industry got spoiled and the investors got spoiled; they have had such a good decade. Most of these people think they should be growing at double digits, yet their sales are only growing 5 or 6 percent. It is almost impossible to maintain these growth rates."

Margins were artificially high in the 1980s for a number of reasons, including: massive dis-diversification — getting rid of all these peripheral operations; very favorable commodity costs; a favorable 1986 tax reform bill; and a tremendous fear of taken over that motivated managers to increase profits, said Leach.

However, by the recession, many of these benefits had about played played themselves out, leaving expectations for the '90s rather modest, compared to the spectacular run the food industry had in the '80s.



STATE OF THE FOOD INDUSTRY

Product Development

Although the food industry has weathered this most recent economic downturn better than a lot of industries, many food R&D budgets have been slashed. Could it be, that in these companies, R&D is seen only as a cost center, and therefore expendable?

On the other hand, according to *FE*'s Executive Advisory Panel survey, just as many R&D budgets are the same or higher than before the recession. How do you manage R&D in a recession?

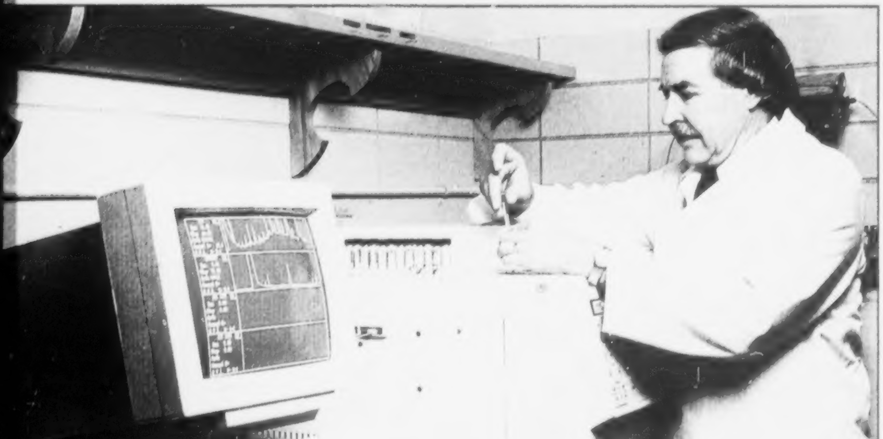
Obviously, there is no easy—or single—answer. Companies who are forced to cut R&D budgets are probably not doing well overall, commented Dr. Larry Kuzminski, vp of technical research and development at Ocean Spray. "Companies fail in good times as well as bad. The recession probably weeded out the weaker companies," he said.

However, according to our survey, many companies who reduced R&D budgets are medium to large—employing over 500 people. This can be explained in part by the corporate culture of some companies with many bureaucratic levels. They are averse to risk and need quick returns to preserve the bottom line. In these cases, long term projects are often shelved in favor of shorter-term, lower-risk line extensions.

Maintaining the status quo

But as we alluded to earlier, most panelists reported little or no change in R&D budgets. Battelle Inc. (Columbus, OH) reports the same. "Food industry R&D spending is only predicted to grow about 1 percent, which mirrors other industrial R&D spending," said Dr. John Litchfield, research leader at Battelle, a technology management firm. "However, things will shrink in some areas and expand in others," he noted. Litchfield cited the recent workforce reductions at NutraSweet and Kraft General Foods and growth of supplier (both ingredients and process equipment) research and development.

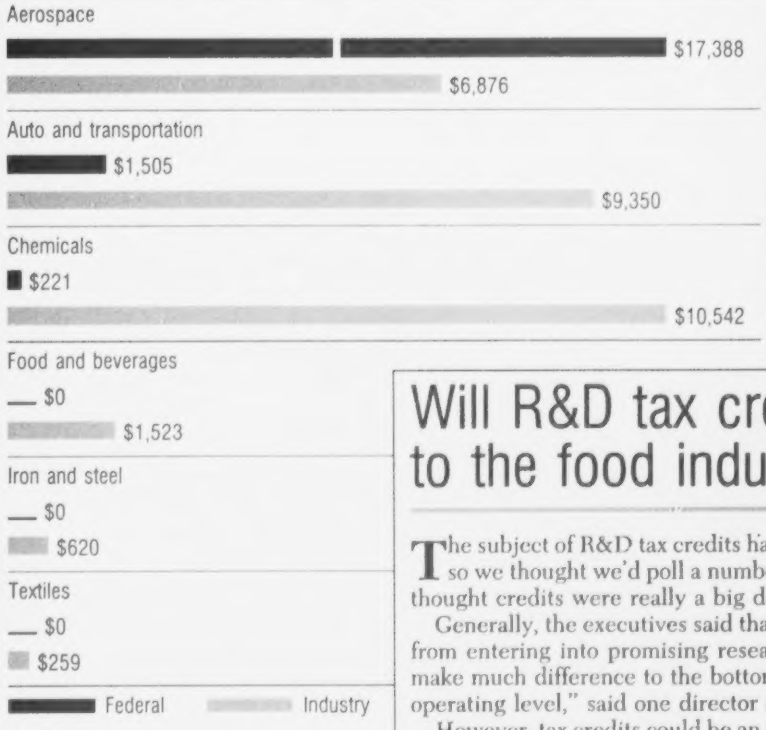
Another reason for unchanged budgets may actually be the most simple: if economic analysts can't correctly predict conditions 12 to 16 months into the future, how can food company managers? "Last May, when we were planning our budget, we knew that we were in a recession," said Larry Kuzminski, "But we didn't know if things would get better or worse in '92." And so, Ocean Spray's R&D budget stayed about the same as the year before.



Sources of OPT in the dairy industry include the Wisconsin Milk Marketing Board and National Dairy Board. (Source: WMMB.)

Funding R&D in 1991[1]

(Selected industries shown in millions of dollars)



[1] Estimate.

Source: Battelle.

Will R&D tax credits be a boon to the food industry?

The subject of R&D tax credits has cropped up in the presidential campaign, so we thought we'd poll a number of food industry executives to see if they thought credits were really a big deal after all.

Generally, the executives said that the *lack* of tax credits wouldn't stop them from entering into promising research. But receiving credit doesn't seem to make much difference to the bottom line either. "It will have no effect on an operating level," said one director of R&D at a large midwestern company.

However, tax credits could be an incentive to take risks. "Companies may be less conservative in their research if they are compensated for risk," echoed an East Coast consultant and a research head from New England.

We will have to wait and see if tax credits provide a shot in the arm for food R&D, but just about all of the executives we talked to felt that the credits should be permanent. In crunch time, every little bit helps to keep the R&D machine humming along.

Innovate or die

"When the going gets tough, tough companies start spending," writes Brian Dumaine in *Fortune* magazine. He warns executives to steer clear of knee-jerk responses like cutting back on marketing and product development. Smart companies take calculated risks. Why? Because your competitors do!

Today, in the aftermath of megamerger mania, stockholders seem to be more patient about returns so companies are freer to invest in research. But if your business is propelled by technology, then you must introduce new products—at the risk of losing your market share to those who do. "It is a day-to-day responsibility for any company to develop products that have a technological point of difference," asserts Ocean Spray's Kuzminski.

But sometimes high risk brings about a big payoff. "Boosting spending in a recession requires a killer instinct," says Dumaine. "You could be delivering the deathblow to marginal companies."

It is important to keep an eye on your competitors' R&D spending. According to Larry Kuzminski, Ocean Spray has invested in this type of benchmark study. He has found that there is some funneling away from R&D, but to him, this reflects a myopic strategy. "There's got to be both near and long term spending if companies want to grow," he said. The most effective programs combine tactical projects that help to build the core businesses and improve profit margin with long term projects that are new for the company.

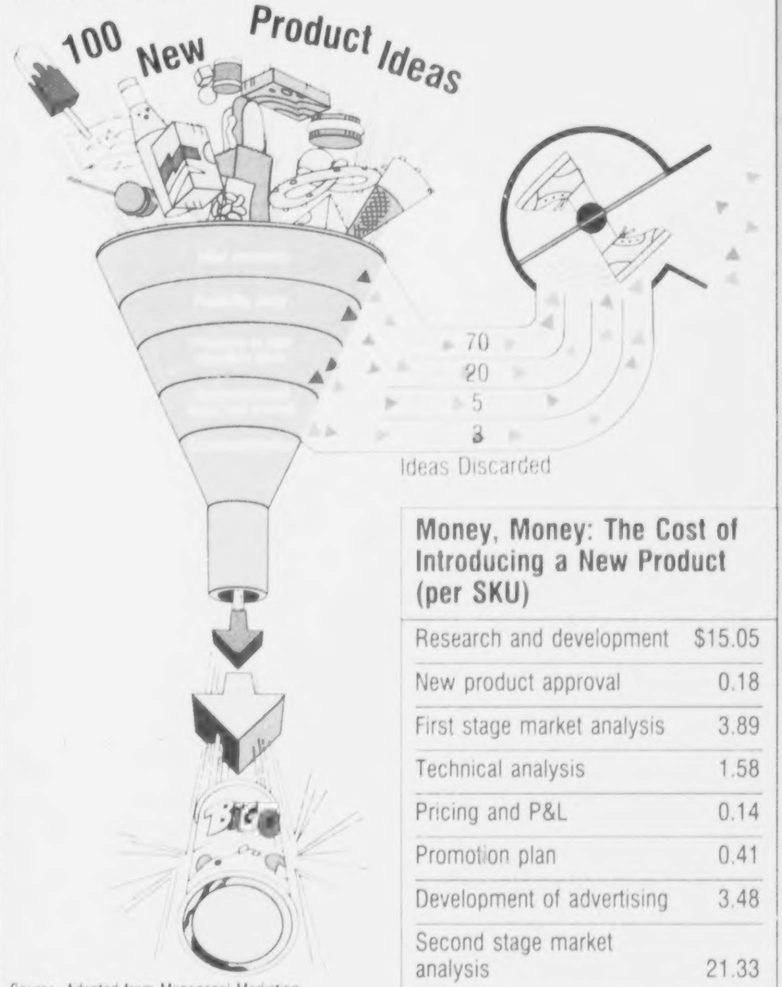
Even "Me-too R&D" has its place. Although many food development purists scorn this type of research, it can serve both short and long term goals. Chances are, a me-too product will make some money for a company, since it is a knock-off of an already successful product, but me-too products are also a way of easing companies into new businesses.

NIH syndrome

But all over the country and in every industry, there has been a consistent failure to link research spending and results. Many, many large companies are losing marketshare to smaller, speedier rivals. Consider General Motors and the Japanese auto industry; IBM and Compaq. The same can be said for the food industry.

Experts place the blame squarely on management's shoulders. For instance, the management of some of the largest food companies are preoccupied with short-term thinking and guaranteed "home runs." New product offerings are limited. It is also

The New Product Funnel



Source: Adapted from Managerial Marketing

Money, Money: The Cost of Introducing a New Product (per SKU)

Research and development	$15.05
New product approval	0.18
First stage market analysis	3.89
Technical analysis	1.58
Pricing and P&L	0.14
Promotion plan	0.41
Development of advertising	3.48
Second stage market analysis	21.33
Communications with sales	4.82
Full scale production	17.91
Calls on stores	2.92
Store operations	7.49
Trade deals	36.34
Consumer communication	102.86
Monitor performance	2.23
Modify promotions	1.49
Average Cost	**222.12**

Source: adapted from Supermarket News.

likely that these companies suffer from Not Invented Here syndrome—a resistance to any technology not developed in-house.

"Companies have to admit that 95 percent of research is going on outside their door," said Ken Kovaly, president of Technical Insights Inc. (Englewood, NJ), a consulting firm that aids companies in technology transfer and management. 'There is a lot of technology available through the government, universities and competitors. But too many people say 'We spend a lot on R&D, why should we spend more?' Companies have to admit they *need* it," said Kovaly.

New technology comes with its own set of caveats, however. "Technology can involve difficult choices," says Battelle's John Litchfield, "To adapt or not, to innovate or not, and the question of short-term losses vs. long term profitability."

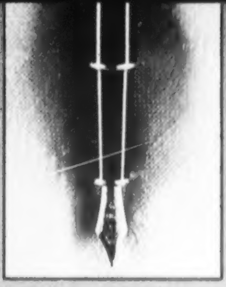
In-house attempts to develop all the technology necessary to stay ahead of the game is risky, time-consuming and expensive. Kovaly argues that no company, not even very large ones, can depend entirely on internal R&D to stay competitive. Product life cycles may be shorter and the costs of introducing new products higher, but companies need to keep a steady stream of new products flowing to stay competitive.

Other people's technology

Exploiting other people's technology is the key to corporate growth. Surprisingly, a serious technology acquisition program can cost only about 2 to 3 percent of the total R&D budget, according to Kovaly. He defines other people's technology as any incremental or radical technological breakthrough that is developed outside one's own organization. "OPT can come from a competitor down the street or an unrelated laboratory around the world."

Finding OPT is difficult, admits Kovaly, but it is feasible for any size company. Large companies can afford to have several positions devoted exclusively to technology acquisitions, but smaller companies can create in-house task forces to survey the literature and review patents. Whether large or small, operations still require three levels to operate efficiently: knowledge acquisition, technical evaluation and technology acquisition/implementation.

- *Knowledge acquisition:* Members of this group read journals, attend conferences, review patents and report their findings to the Technology Evaluation group.
- *Technology Evaluation:* These people should have advanced degrees,



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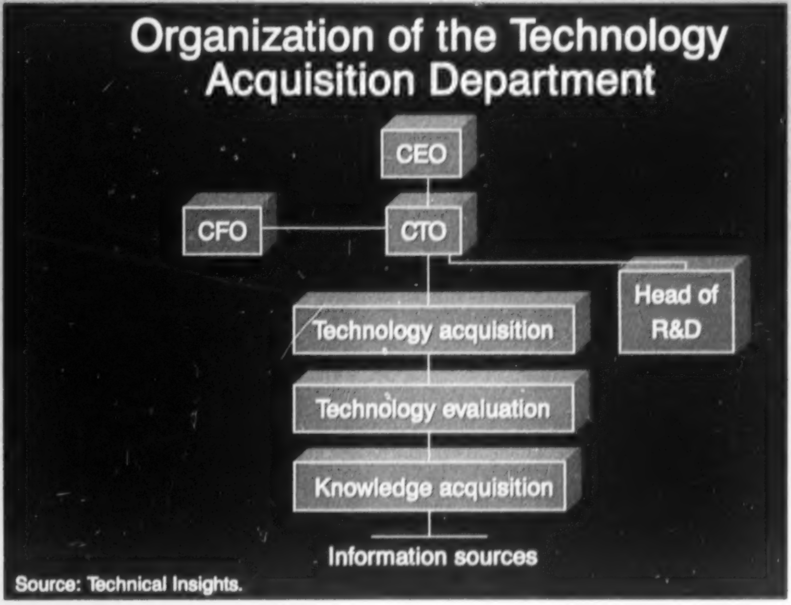
which helps them to evaluate the technical information quickly. "This group should also understand how the technologies fit into their company's business and separate the technological wheat from the chaff," says Kovaly.

•*Technology Acquisition:* This group, often part of the executive board, approaches the source of the technology, whether it be universities or consortia like the Center for Advanced Food Technology at Rutgers University in New Jersey.

Universities are plentiful, and stocked with academic talent ready for collaboration with industry for a fraction of the cost of setting up in-house teams. And suppliers and contract R&D firms are especially good for companies who are entering a new category, but eventually companies will have to break away with their own proprietary formulations. Or, companies can simply buy technology from the many companies offering licensing agreements.



Organization of the Technology Acquisition Department

Source: Technical Insights.

Strategies and Sources for Acquiring OPT

Sources (suggested strategies)
Patents (1-3,6)
Universities (2-6)
Companies (1-5)
Government (3-6)
Technical literature (6)
Science parks (4-6)

Strategies
1. Purchasing
2. Exclusive licensing
3. Nonexclusive licensing
4. Joint ventures
5. Consortia
6. Information acquisition

Source: Technical Insights

Chief Technical Officer

The advent of technology acquisition groups in food companies requires the presence of a technically trained individual on the executive board—the Chief Technical Officer.

According to Technical Insights' Kovaly, the CTO makes sure new technology improves a company's competitive position without blindsiding it with other competing products and processes.

At Borden, the Vice President of Science and Technology is considered the CTO. If one were to picture an organizational chart, the CTO, Dr. Eugene Skiest, would have direct line technical responsibility for all food products as well as dotted line responsibility for packaging and other areas related to brand development. Skiest is involved in all technology, including process engineering, and makes sure that technology gets considered at the highest level—the CEO.

"The CTO is fairly common in the chemical industry, and we have taken their cue," says Paul McSweeny, associate director of strategic R&D at Borden, who reports to Skiest. Since the inception of the technology acquisition program about five years ago, McSweeny and Skiest have been developing long term projects for the company, sometimes beyond Borden's business units. "In fact," says McSweeny, "the best ideas sometimes come from outside the food industry."

McSweeny is in charge of scouting and assessing technology, as well as determining if the technology fits in with the company's strategic plans. When they find something they like, McSweeny's group will approach the source and begin negotiations for acquisition. Dr. Skiest serves as an advisory to the executive board.

But the game plan differs depending on the technology. "If it is a technology that can be plugged right into existing businesses, management takes right over. But if it's a developing technology, then the science group works with it a little longer," explained McSweeny.

Although a CTO position is not feasible for every company, top management should be aware of the impact of new technology on their business. Nowadays, there is too much pressure on R&D staffs to come up with successful new products *not* to explore every avenue. Think of it this way, the technology on somebody else's drawing board today may be the new product that helps your company ride comfortably through the next recession.

Marketing

With its sales and marketing plans securely in place in 1991 amidst an economic downturn, the food industry's efforts to promote and sell itself held steadfast in somewhat muddy waters. Faced with economic uncertainties, consumer spending in the industry dropped off in 1991, leaving the sector to face more competitiveness and tougher marketing ploys.

The Food Institute reports that early numbers for 1991 indicate that spending for food at home amounted to approximately $306 billion, up 2.8 percent from 1990. After adjustment for rising food prices, the Institute says that it appears there was little if any "real" growth in expenditures during 1991.

"In general, I would say the recession has not affected food companies to a great degree," says Harry Rubbright, president, The Rubbright Group and Rubbright-Brody, Inc., Eagan, MN. "But for the short term, there is a slow down in some activities since many items have been reprioritized. A project that could be number two on a list is now number eight."

Trends and Forecasts: Food Retailing (in millions of dollars except as noted)

Item	1990	1991[1]	1992[2]	Percent change 1989-1990	Percent change 1990-1991	Percent change 1991-1992
Sales						
All food stores	367,827	380,333	395,546	5.4	3.4	4.0
Grocery	345,836	358,632	373,695	5.0	3.7	4.2
Meat, fish	6,789	6,850	6,919	3.9	0.9	1.0
Bakeries	5,920	6,388	6,912	8.4	7.9	8.2
Other	9,282	8,463	8,020	22.3	-8.8	-5.2
Chain food stores	206,981	215,777	224,624	5.9	4.3	4.1
Chain grocery stores	195,345	204,355	212,529	1.0	4.6	4.0

[1] Estimate. [2] Forecast.

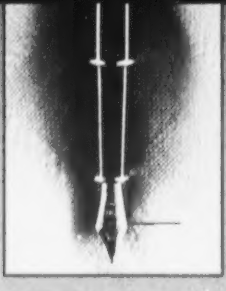
Source: U.S Department of Commerce: Bureau of the Census and International Trade Administration.

There is one priority, though, that should be kept high on the list: the establishment and maintenance of a good battle plan to ward off the ill effects of recessionary times. "We were doing good at the beginning of 1991," explains Dan Nagle, vice president sales and marketing, Tasty Baking Company, Philadelphia, PA, "and then the overall downturn hit. We have a good, solid plan for 1992 in place and we will try to stick with it. Some changes may occur, but for the most part, it is a sound company-wide plan that will get us through."

Nagle explains that the company sells what is known as an "impulse item" since about 85 percent of the buyers of the Tasty products do not have the product on their shopping lists originally. The company noticed the economy taking a downturn when earnings went up and sales became flat. When employment is down, less lunches are packed, thus affecting sales of a product of this type.

But, this is not a time for sitting and waiting, as all sources contacted by *FE* agreed. Recessionary times may mean more competitiveness, but products must still be sold. "We are promoting aggressively," says Dan Nagle, "and we are out to get market share. We have also increased our couponing efforts because we feel if we promote now, we can do better overall."

Harry Rubbright concurs by saying, "if products are not promoted, they don't sell. The basics (flour, sugar, spices, etc.) always sell, but other products need to be promoted." He goes on to explain the differences in the promotion of a microwaveable meal. A product such as Dial's *Lunch Bucket* needs promotion because of competition with other very, similiar-type brands. A product such as a



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Weight Watchers microwaveable meal, on the other hand, may be higher priced but it is being purchased to meet a specific need and does not need a lot of extra promotion. "We are also seeing more free-standing inserts in the media," says Rubbright, "and strengths come from a company that has more clout to put out more free-standing inserts and coupons in order to promote itself."

The Warehouse Club Industry: 1982-1991

Year	Number of warehouses open	% Increase	Sales (millions)	% Increase
1982	8	60	$ 366	61
1983	21	163	891	43
1984	66	214	2,053	130
1985	118	79	4,197	104
1986	209	77	7,140	70
1987	257	23	10,218	43
1988	306	19	13,808	35
1989	351	15	17,319	25
1990[1]	430	23	21,680	25
1991[1]	513	19	27,900	29
Compound annual growth rate, 1986-1991:		20		31

[1] Estimate.

Source: Stephen F. Mandel, Jr., Tiger Management, New York.

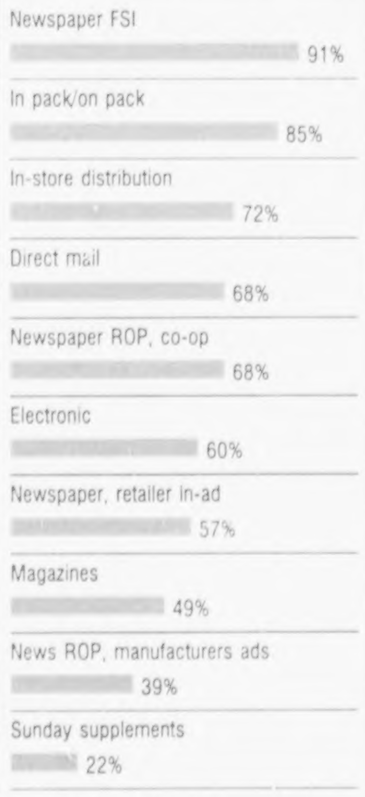
In addition to specific promotion activities, there is another medium that companies often question with regard to their sales and marketing efforts during downturns: advertising. There have been drop-offs in print advertising in the last year according to studies conducted by Donnelley Market surveys. Companies may feel their advertising dollars would best be spent elsewhere such as in direct promotion activities or discounting. Sometimes ad budgets are cut, sometimes they are not because many companies feel that advertising is the best way to win the battle.

Dan Nagle of Tasty Baking says that the company has stayed with an advertising budget that was in place for the last few years despite the economy being in a downturn. "With advertising, there is a longer time frame for a company to see a return-on-investment [ROI]," says Nagle. "We could move money over to the promotional side, but this would be temporary. We know from a study conducted several years ago that advertising has kept us at the top of this business. Advertising is a very necessary part of the business for us."

Sometimes, though, a company must choose between advertising and promotion if budgeting problems arise in difficult times. There is a distinct difference between the two and maintaining a balance is the best and wisest path to take. Advertising establishes lasting impressions and provides a longer term payback for its cost. It cannot be measured in the same way samples can be counted that are given out or mailed out as part of a direct promotion campaign. Trade promotion, on the other hand, is short term.

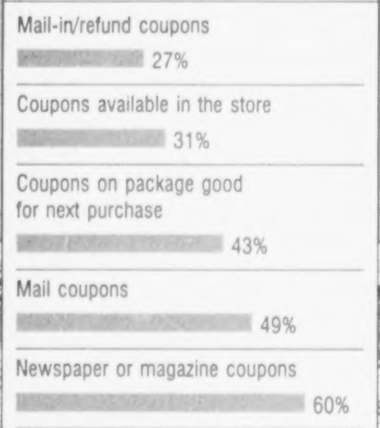
A good example of a recent successful trade promotion is related by Elizabeth D. Weinmann, vice president, account director, food and beverage marketing with the Creamer Dickson Basford agency in New York City. "CPC International just ran a coupon in the Sunday edition of the *New York Times* for a free sample of Hellman's new product, *Dijonnaise*. Consumers were so excited about the product and the coupon that they cleaned off the shelves in the supermarket. Here, we have a very effective promotion that turned out to be a winner: the compa-

Which Coupon Media Do Manufacturers Use?



Source: Donnelley Marketing

What Type of Coupons Do Consumers Use?



Source: The Roper Organization.

ny created brand awareness right from the beginning."

Another company taking an aggressive stance and using promotion in this recessionary environment is Borden, Inc., as company executives outlined performance objectives at this year's Consumer Analysts Group of New York (CAGNY) conference held earlier this year in Florida. "We are managing our North American snack business by defending the strong number two position we continue to have on the supermarket shelf," said George J. Waydo, president, snacks and international consumer products division. "The company will protect its volume with competitive pricing. That means we need to take costs out of our business to match the industry's deep discounting and aggressive promotions." Waydo also indicated that Borden has centralized its marketing for improved effectiveness and control.

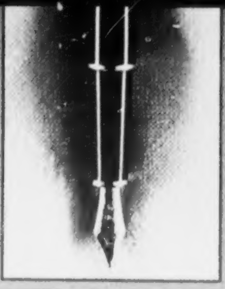
So, with growth flat in consumer expenditures for food during the last year and the industry attempting to meet increased competitiveness and persuade consumers to "try my brand," the only question left to ask is, "Is the effort working?"

All the advertising and promotion efforts in the world will not work if the targeted party is unreceptive or does not take advantage of special offers such as coupons and discounts. "Regular network television buys just aren't that effective with consumers anymore," says Elizabeth Weinmann, "since some of the groups the companies are marketing to are not in front of the set when the ads run." She gives an example of products that are marketed to women, who, in large numbers, are not home during the day if the ad campaign is running then. "To be more effective, a company could consider a targeted promotion, say for example, sponsoring a woman's film festival where a precise, targeted audience is reached. The idea is that the event generates publicity in that marketplace as well as in publications that working women read."

And with people simply not buying like they used to, reaching an audience has just become tougher and tougher. A recent study by the Food Institute concurs with this view: new shopping habits have evolved as consumers attempt to economize during a poor economic climate. In its survey, the Institute reports that 23 percent of consumers polled indicated they were stocking up on specials, 21 percent were buying store brands instead of national brands, 18 percent were making more impulse purchases when they find bargains, and 12 percent were shopping at a discount or warehouse food store for groceries.

The industry's efforts in couponing seem to have paid off, though, according to The Food Institute's *Food Retailing Review* and NCH Promotional Services, the nation's largest coupon distributor. The service reported that 54 percent of shoppers increased their use of cents off coupons as a result of the recession. Almost 75 percent also indicated they would increase their use of coupons in the coming year.

With consumers indicating a switch to store brands more and more, marketers have increased their budgets for coupon distribution in order to keep those same consumers loyal to their brand. Free-standing inserts are used the majority of the time for coupon distribution, making up 80 percent of this traffic, according to the Review. The rate of coupon redemption and the gross national product are often considered to be inversely related: coupon redemption increases



Adventures in the supermarket: real life shopping

The Russell family lives in Towson, Maryland, a suburb of Baltimore, and represents a slice of middle America: two working parents (Bob and Pam), four children (ages 13, 11, 5, 2), and a dog. This "slice" is often a target of the food industry's marketing and promotion efforts, so in order to see if the effort is working, *FE* sat down with the family to talk about its shopping habits.

The Russells shop in two types of stores: a regular chain and a warehouse club facility. Giant Food Inc., a full-service supermarket chain throughout Maryland, Washington, DC, and northern Virginia. is the chain store of choice for the family, according to Pam Russell. The family owns a premier membership to K-Mart-owned Pace Warehouse, located outside of Reisterstown. A premier membership costs $25 per individual per year, and an additional $10 for a spouse to have his/her own card.

"One of us goes shopping once a week at Giant Food," says Pam, "and about once a month at Pace. We used to go weekly to Pace but now we find it unnecessary to do that."

The Russells plan a menu for a five-day week and purchase their groceries accordingly. "We write a complete list and really try to stick to it," says Pam, "but sometimes there are variations, like something special that is needed for school. We do very little impulse buying. If we go off the list, it may be for something that we use and if it is on sale, we will buy it." For example, Giant Food often runs "superdeals" which are multipacked or large-size grocery items sold for a special price.

Large sizes, though, are a specialty of the warehouse club shopping phenomenon. Here the family buys many items, like juices, cereal, and basic staples (flour, sugar) and will try not to buy them in Giant Food at all. "We buy tons of cereal," says Pam. "Pace always has bigger sizes than Giant, say two 30-ounce boxes packed together in a carton. We often buy three cartons on each trip and inside of two weeks, they are just about gone." Pam and Bob both agree they have saved money by shopping at the warehouse since it "now hurts to buy something at Giant Food you know is available at Pace as well," says Pam. "Giant Food is convenient but it is often more costly."

Yet, the family is loyal to store brands from the chain as opposed to name brands available at Pace. They believe there is no real difference between store and name brands for items like bread, frozen and canned vegetables, and paper goods. And, even with coupons or Pace prices, the store brands are cheaper.

Pace stocks about 90 percent of what the family needs for groceries. However, Pace does not accept coupons, which is one of the significant marketing efforts put forth by the food industry last year. And, coupons are not very important in this household, according to Bob. "We do use some coupons, but they are a nuisance," he says. "By the time some of the items get on the list, the coupon may have expired. They should institute more instant coupons that are stuck right on the product. And, besides, look at all the paper you save."

Finally, there is one member of the family that significantly affects shopping patterns: the dog, a three-year-old black Lab named Pepper. The family must buy her food at Giant Food (25-pound bag) because she refuses to eat the food Pace stocks (in 50-pound bags only). The price at Pace is excellent, making the situation more ironic. It all goes to show that even when you are a discriminating shopper, sometimes you just can't win.

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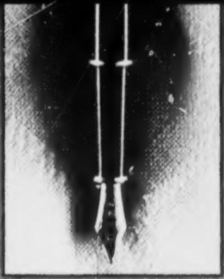
as gross national product declines.

Another marketing effort put forth by the industry which consumers have taken to heart is the participation in the warehouse club arena. This phenomenon seems to have taken the country by storm as sales for this segment reached $12 to $14 billion in 1991. In effect, there is a lot of marketing potential for companies and a lot of savings for consumers in this rapidly growing market. It is believed that the clubs will gain market share at the expense of less efficient forms of retail establishments since the clubs usually do not mark up anything more than 15 percent.

Several national companies have already jumped on the warehouse bandwagon, developing and selling lines of products just for the club market. Frito-Lay, Inc., Campbell Soup (which created a new business group to handle the warehouse segment), and Borden (which sells bulk-size items in clubs) have made significant inroads into the warehouse industry.

With so many choices for consumers and so much effort put on getting and keeping them to a particular brand, it is no wonder the food industry must put its best efforts forward in the sales and marketing battles waged during recessionary times. And, let's not forget about the consumer affairs person, says Elizabeth Weinmann, because this individual may be the most important person in the product-consumer relationship. "The consumer affairs person receives the 1-800 phone calls: the complaints, the questions, the problems," she says, "and there should be more information sharing between these individuals and others in a company. For example, consumer affairs might discuss something with R&D that came from a complaint and improvements could then be made, because after all, the industry is trying to make the best product possible."



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Manufacturing

In spite of recession, capital spending for new plants and equipment in the food-processing industries reached a record $17.7 billion in 1991, up nearly 8 percent from 1990 and 11.3 percent from 1989, according to USDA's *Food Marketing Review, 1991.*

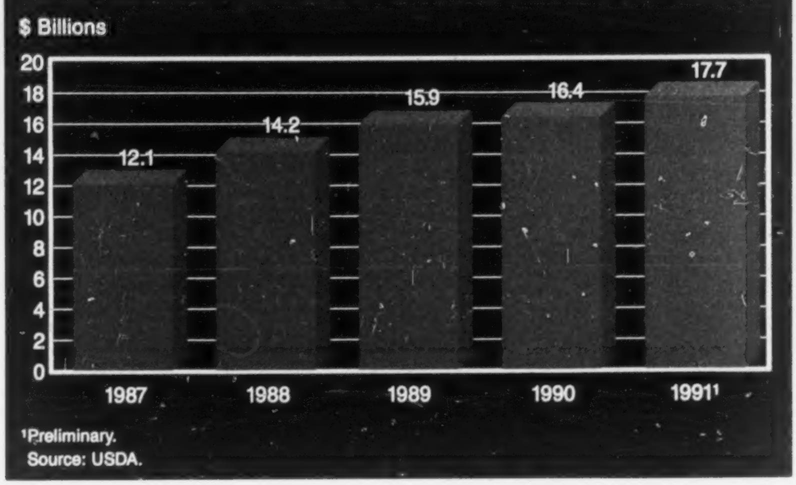
As reported in *Food Engineering's* 1992 New-Plant Survey (April '92), however, the number of new-plant and major expansion/renovation projects declined dramatically from a record 456 in 1990 to 305 last year.

Conclusion: More money is being spent on fewer plants.

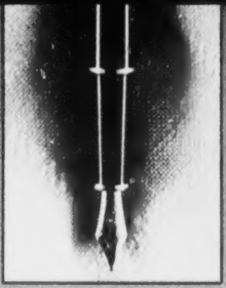
Improved manufacturing productivity was a major contributor to rising food-industry profits over the past several years. In the drive to boost productivity and product quality while cutting costs—to achieve the status of "low-cost producer" and react more quickly to market trends—food processors are shuttering older plants, upgrading and expanding their best existing plants, and building fewer but more highly automated new plants of greater capacity. Examples in 1991:

- Sara Lee shut-down its flagship plant in Deerfield, IL—a state-of-the-art frozen baked-goods facility just 25 years ago but considered too costly to renovate today—and shifted its capacity mainly to a newer plant started-up in 1988 at Tarboro, NC.
- Hormel shut-down a beef-processing plant at Springfield, MO and distribution centers in Hawaii, California and Florida; expanded its Dold Foods bacon/ham plant at Wichita, KS; installed new *Micro-Cup* shelf-stable soup/entree lines at Atlanta and Beloit, WI; added precooked bacon and microwave bacon lines at Austin, MN; started-up its new *Super Select* modified-atmosphere fresh-pork process at Austin; boosted dry-sausage production by 20 percent at Knoxville, IA; and added equipment to produce microwaveable meat pies and turkey-breast entrees at Oklahoma City.
- General Mills spent $50 million to upgrade and expand its Cedar Rapids plant; plans to expand its South Chicago facility to boost cereal production by 25 percent without expanding the work force; started-up a new $100-million-plus, 450,000 sq.-ft. plant at Covington, GA capable of producing all "Big G" cereals with a total staff of 125; and is starting-up another new, $128-million plant this month at Albuquerque, NM.
- Borden, which "compressed into two-and-a-half years a massive worldwide reconfiguration that would normally take five to seven years to complete" by consolidating 45 older plants into 23 "hyperplants," added three new hyperplants (including a $100-million-plus pasta plant at St. Louis) and expanded eight others to hyperplant efficiency. The company shut-down or sold 14 older dairy plants and consolidated dairy-products production at five.

Capital Expenditures in Food Processing



[1] Preliminary.
Source: USDA.



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According to USDA, the number of food-processing plants in the U.S. declined over the 20-year period 1967-87 by more than 36 percent—to 20,624 in 1987, the latest year for which government figures are available. But after the wave of mergers, acquisitions, consolidations, restructurings and leveraged buyouts that swept the industry during the late '80s and early '90s, that figure has obviously been reduced.

U.S. Investment in Foreign Food Industry vs. Foreign Investment in U.S. Food Industry (millions of dollars)

	1985	1986	1987	1988	1989	1990
U.S. investment overseas	9,252	10,968	12,682	13,281	13,464	15,961
Foreign investment in U.S.	10,710	12,147	16,004	16,437	17,669	18,738

Source: U.S. Dept. of Commerce

Food Engineering's 1992-93 *Directory of U.S. Food & Beverage Plants* lists 11,881 plants employing 20 or more people. These plants account for 94 percent of all U.S. food-manufacturing activity. *FE's* estimate: There are currently no more than 12,640 food/beverage processing plants in the U.S.—*down another 39 percent in just five years!*

Construction trends

According to *Food Engineering's* 1992 new-plant survey, red-meat plant projects surpassed poultry-plant projects for the first time in several years, suggesting that the poultry industry is near capacity as meat processors develop more value-added, reduced-fat products in an effort to recapture lost ground.

Another trend revealed by *Food Engineering's* 1992 new-plant survey: a surge of major plant expansions in agribusiness industries such as starch, sugar, corn syrup, soy-protein and edible-oil processes.

Few sugar-plant projects were commissioned during the decade 1978-88 after several high-fructose corn-syrup (HFCS) plants were built and HFCS replaced sugar in many applications, observes Richard T. Gadomski, chairman and CEO of The PSI Group (Memphis), which completed more than 40 food-plant projects last year. But rising demand for value-added products and the need to improve ROI sparked the need for greater capacity over the past three years. Refiners such as Savannah Foods, Minn-Dak Farmers Co-op, Amalgamated Sugar and Holly Sugar increased plant capacity by installing new molasses-desugarization technology, which boosts extraction efficiency of sugar from beets by 10 percent (for nearly 90 percent yield) and reduces seasonal downtime by extending production beyond the annual "campaign." Refiners can now store molasses and extract more sugar when the campaign is over. New plants are few but bigger and more capital-intensive. Example: Western Sugar Company's new $36-million refinery at Scottsbluff, NE, slated for startup next month (July '92) and "which cost more than Tate & Lyle paid for the entire company 10 years ago," Gadomski observes.

The advent of starch-based fat replacers has created "a big flurry of starch projects," Gadomski adds. PSI currently has five starch projects underway, including three for National Starch & Chemical Co. and one for Grain Processing Corp. Other major starch projects include A.E. Staley's expansion at Loudon, TN, Cargill's plant expansion at Memphis, and the $35-million Penford Products expansion at Cedar Rapids.

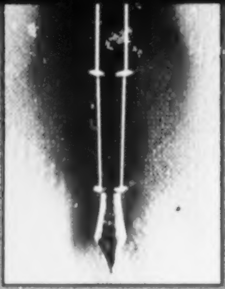
'World-class' plants

According to the 1990 "benchmark study" conducted by A.T. Kearney Inc. (Chicago) of more than 100 food plants operated by 40 companies in North America and Europe, today's "world class" food plants are eliminating the traditional quality-control function, making operators more responsible for in-process quality, and applying Total Quality Management (TQM) for continuous productivity improvement. The best companies are also:

- Applying distributed control systems (DCS) to integrate process, quality and production controls;
- Flattening plant organization by three or four levels:
- Widening supervisory control to ratios like 25:1;
- Boosting the ratio of hourly to salaried people by 6 or 7:1;
- Establishing self-directed, team-oriented work forces;
- Establishing vendor partnerships.

The study included firms such as Kraft General Foods, Campbell Soup, Coca-Cola, Heinz, Kellogg, and Sara Lee. Following the first benchmark study in 1987, the 1990 study assessed each company against the original study in 14 areas such as quality, customer service, costs, technology and manufacturing flexibility. According to Kearney Vice-President William H. Windle, some clear leaders emerged in 1990. Today's best plants have:

- Reduced overall costs by 9 percent, as compared to a rise of 1.4 percent in the average plant;
- Reduced material costs by 5 percent, as compared to a rise of 1.6 percent in the average plant;
- Reduced value-added costs by 10 percent, as compared to no gain by the average plant;
- Reached capacity utilization of 75 percent, vs. 50 percent in the average plant;
- Achieved product changeover online in 10 minutes, vs. 48 minutes in the average plant;
- Automated 90 percent of their production lines, as compared to 40 percent in the average plant;



- Reduced raw-material inventories to five days vs. the average 14, and finished-goods inventories to five days vs. the average 30;
- Replaced more labor with capital: Capital expense is 13 percent of manufacturing cost in the best plants vs. 7 percent in the average plant.

Strategy, technology trends

TQM programs established by major food processors embrace a wide range of manufacturing strategies. The elements of Campbell's Total Systems Approach (the manufacturing part of its TQM system) interact "like the ingredients in gunpowder," said Vice-President/ Manufacturing Francis A DuVernois at the 1991 NFPA convention in Chicago. "Using any one or two alone... will not achieve the same overall result as you might if all are used together, in harmony. That is when you get explosive results!"

Common denominators of TQM systems: They are considered never-ending *processes*, not programs; require *management commitment* to succeed; are dedicated to *continuous improvement* and incorporate concepts such as:

- *Computer-integrated manufacturing (CIM)*. As reported by *Food Engineering* (Feb. '92), open architecture, industry standards and vendor partnerships are lowering costs, enabling larger food processors to evolve more quickly into enterprise-wide CIM.
- *Flexible manufacturing systems* capable of producing several different products and/or package sizes on the same line with minimum changeover time. Examples: Extrusion, where several different cereals, snack foods or pet foods can be produced on the same equipment by simply changing the die and/or screw flights; roll-on/roll-off equipment such as used to vary pasta production or change snack flavors on the same line; form/fill/seal packaging machines which can fill different products in bags of varying size. "The total volume of food production is increasing only marginally, yet thousands of new products are introduced every year," observes Peter Clark, president of Epstein Process Engineering Co. (Chicago). "This means shorter runs of individual products, requiring flexible systems." But the idea of flexibility, which emerged from the discrete-manufacturing industries, can mean different things in continuous or batch-continuous food processes, Clark adds. "What's right for one company is not necessarily right for everybody else."
- *Just-in-time (JIT) manufacturing and distribution*. The Kearney study assessed JIT on the basis of four standards. The best plant in the study had reduced: *raw-material delivery time* by 44 percent as compared to the industry average of 22 percent; *setup time* by 34 percent as compared to the average 18 percent; *lot-size reduction* by 24 percent vs. the average 14 percent; *inventories* by 44 percent vs. the average 23 percent. Latest development in JIT: The *Quick Response* system developed by efficient market services, Inc. (Northbrook, IL), now being implemented by Kroger Company's Columbus and Nashville divisions to transmit scanning data from individual supermarkets to major processors for quick store replenishment.
- *Statistical process control (SPC)*, which empowers the operator to make production and quality-control decisions on-line, boosting JIT production and process flexibility, elimi-

Total Manufacturing Systems Approach

Employee Involvement: Quality circles, Task forces, Work groups, Operator control

Just In Time: Changeovers, Low inventory

Vendor Involvement: Select suppliers

Preventive Maintenance: Reliability, Flexibility, Employee ownership

Improved Communication: Meetings, Checklists, Interpersonal skills

Quality Assurance: Job certification, System appraisal

Customer Involvement: Service levels

Statistical Process Control: Control charts, Prevention, Capability

Source: Campbell Soup Co.

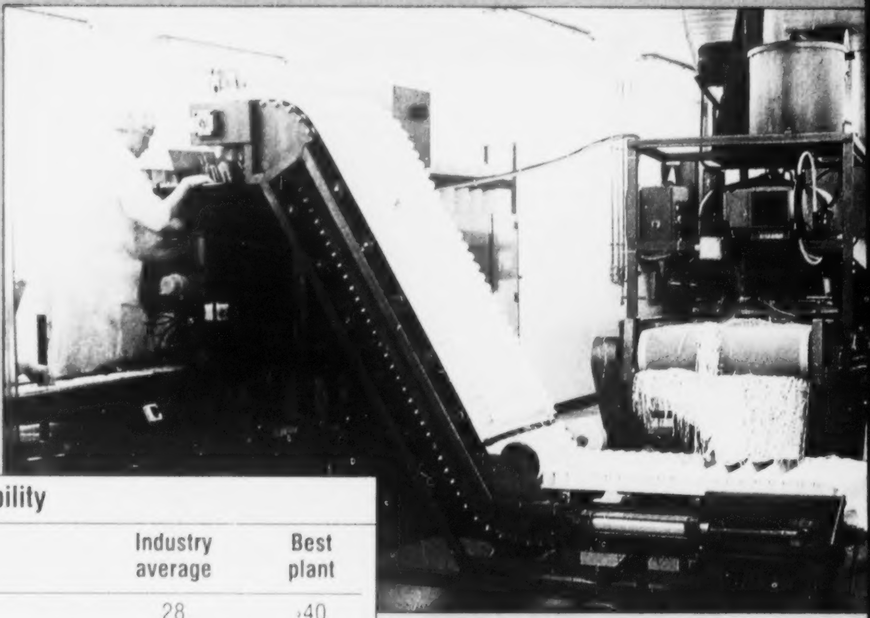
nating many QC-lab functions, and reducing the need to inspect finished products. SPC allows the operator to adjust process variables before they go out of spec, but detects these variables only after the fact. Next innovation: *Predictive control*, which applies artificial intelligence to predict process variables based on product formulation and adjusts these variables *before* processing, observes William A. Wheeler III of Coopers & Lybrand's Center For Manufacturing Technology (Burlington, MA).

- ***Self-managing production teams*** **which allow production, quality, maintenance, management and training** decisions to be made at the operator level and encourage people to work at their full potential. Team-based management is not limited to large food companies, notes Wallace W. Graham, a former Frito-Lay plant manager and team-management pioneer who now operates his own team-management consulting firm in Tempe, AZ. Example: Graham is setting-up a team-management system for a new Wilsey Foods edible-oil products plant employing about 40 people at St. Joseph, MO. Reasons for growing acceptance of team-based management, says Graham: 1.) To use "people assets" to best advantage and for greater efficiency; 2.) Productivity gains demonstrated by U.S. plants which have implemented team management; 3.) To relieve "overwhelmed" managers by delegating decisions to the right levels. One misguided motive, Graham cautions: To lower labor costs and eliminate middle-management levels. "That may be something you get out of it, but it shouldn't be the driver," he adds.

Summary of Manufacturing Flexibility

	Industry average	Best plant
Products per line (SKUs)	28	>40
Changeovers per line per week	7	>7
Percent of SKUs that can be run on multiple lines	24	80
Weighted average changeover time (minutes)	48	<15
Average manufacturing cycle time (days)	2.6	<0.5
Product mix cycle time (days)	3	<2

Source: A.T. Kearney, Inc.



One good example of manufacturing flexibility is roll-on/roll-off equipment used to vary types of pasta produced on the same line. (Source: Food Engineering.)

- *Time-compression strategies*, to shorten new-product development time. Several were outlined by executives from Kraft USA, Campbell Soup and J.M. Smucker at the *Food Plants '91* conference last fall in Dallas. Common denominator: Multi-disciplinary teams which take a product from concept to commercialization.

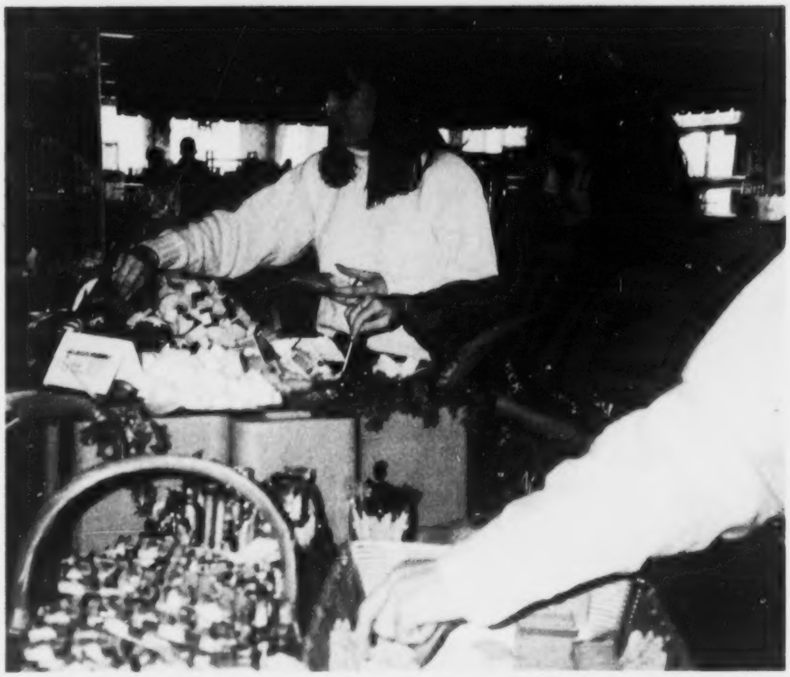
- *Partnerships*, with suppliers and other food processors, to develop new technologies and upgrade manufacturing efficiencies. Examples of American *keiretsu*: The Unilever/Hewlett-Packard OpenCIM development effort; the General Mills/Nestle *Cereal Partners Worldwide* venture to produce and distribute Big G cereals in Europe; the Kraft General Foods/Allen-Bradley/Hewlett-Packard/Bradley-Ward development of *Network DTL HP-UX* open-system architecture; the Central Soya/Mitsubishi joint-venture in the Indiana Packers plant at Delphi, IN – global in scope as the first U.S. meat plant built to EC specifications, with Mitsubishi handling Pacific Rim distribution.

The recessionary pressures that are causing firms to seek more productive manufacturing strategies have initiated revisions of marketing and R&D strategies as well. As the recession begins to ease, those companies most successful at maximizing efficiencies in these areas will be best able address the increased competition predicted for the remaining decade. ▲

OPPORTUNITIES AMID HEADACHES

The key to breaking into food service is to be attentive to what the industry needs and offering solutions that you can deliver.

PATRICIA M. DILLON
SENIOR ASSOCIATE EDITOR



Villanova University Food Service seeks to fulfill student needs in both traditional ways, such as special events, and in new ways, such as asking students for suggestions. (Source: Villanova University Food Services Department.)

When you get lemons, make lemonade—this is an attitude food manufacturers must adopt if they want to break into food service. By finding ways to help food service operators overcome their problems, food companies can get a piece of the $261.8 billion food service market. Some of those problems experienced by food service operators include: labor shortages, government regulations, a sluggish economy, and simply filling food service needs.

Food service operators are facing a dwindling labor supply as the number of qualified workers needed outstrip the supply. The National Restaurant Association (NRA) estimates that 200,000 jobs in restaurants alone remain unfilled. As a remedy, food service operators are seeking non-traditional workers, such as the handicapped, and senior citizens and are automating as many jobs as possible. Anything that saves labor is a welcome solution.

Food manufacturers have met this challenge through technologies that not only reduce labor needs, but offer better quality food. There is more widespread use of vacuum packing and cook chill technologies that allow food to be cooked in a central commissary, packaged, then shipped to individual operations. Saving hours of prep time, cooks need only to heat up pouches of food and serve.

The slowdown in the economy has put the squeeze on food service oper-

Trends and Opportunities in Food Service

- 1992 sales are expected to drop 3%.
- Use of substitutes for high fat ingredients will increase.
- Beef entrees comprise 75% of sales.
- Demand for vegetarian dishes will increase.
- Chicken and fish continue to be common alternatives to beef.
- Broiling and baking are in, while frying is out.
- Menus will highlight "light" sections.
- Hamburgers will account for $36.5 billion in sales in 1992.
- Burgers remain as biggest seller in fast food segment with 47% of sales.
- Greatest growth expected in Mexican, pizza and sandwich outlets.

Source: SRI International.

ators, with sales expected to drop three percent, according to SRI International. "Consumer spending will remain sluggish, and value expectations will continue to rise," said a report completed by Technomic, Inc. for the International Food Service Manufacturers Association (IFMA).

Although jumpstarting the economy is beyond food companies' lemonade-making capabilities, a number of new food products add to the consumer's perception of value. To effectively meet this challenge, food companies must pay close attention to what consumers want—and the list is remarkably similar to what retail food customers want: convenience and a "healthy" slant.

Healthy items are increasingly being found on fast food menus. Dry salads and skinless poultry are offered by 78 percent of the chains surveyed by the NRA in 1991. Reduced calorie salad dressings were sold in 74 percent of the chains; margarine, 67 percent; grilled chicken sandwiches, 59 percent; and whole grain breads or muffins and fresh fruit, 48 percent. Low-fat frozen yogurt, low-fat mayonnaise, low-fat fruit-based desserts and egg substitutes were offered in one third or fewer establishments.

Combining both value and health goals spurred Wayne Farms, Duluth, GA, to develop *Chicken Pizzazz,* cajun chicken pizza topping. "Chicken is the next focus for pizza chains because it is healthy and versatile," said Michelle Fryar, assistant marketing manager, Wayne Farms. Grilled, broiled chicken and chicken sandwiches have become more popular: ironically, so has fried chicken. It seems while there is a general healthy trend, people will stick to old favorites, like fried chicken and fried seafood. Buffalo wings and chicken fingers have also been a major boost to chicken selections on the menu.

Getting back to the health wave, General Mills Foodservice introduced food service portions of its *Total, Cheerios, Triples* and *Wheaties* cereals that are 60 percent larger. GM also unveiled a new low-fat muffin mix for food service operators in response to a 28 percent increase in muffin sales over the period from 1986 to 1991. *Gold Medal Low-fat Muffin Mix* needs only water and allows operators to incorporate additional ingredients to create signature muffins. Ingredients that can be added include: spices, honey, bran, cornmeal, fruits or vegetables.

Marriott Management Services (MMS), Washington, DC, serves over 3,200 clients that include corporations, colleges, universities, school districts, health care, facilities management and child care. Anne Hill, vice president food and beverage for MMS, outlined a few trends:

- *College and University* students want more vegetarian meals and a better understanding of where food products come from, for instance, dolphin-free tuna is a priority. MMS and Villanova University have bottled water available to students.
- *Industry's* CEOs are falling victim to stress-related ailments and are requesting reduced-salt, -cholesterol, and -fat dishes.
- *Health Care* is fully focused on nutrition and is enhancing food presentation in hospital guest dining areas used by staff and visitors.
- *Nursing Home* programs are using pastry piping equipment to display pureed foods more attractively.

Marriott also promotes strong vendor-partnerships with 27 branded products, such as *Minute Maid*, *Dannon* and *Pepsi*. Recently three vendors, (Pillsbury, General Foods and M&M Mars) combined resources to present a three-hour seminar on new dessert concepts for 350 Marriott associates, said Hill. Chefs from Pillsbury and General Foods taught the seminar, which was held in four cities: New York, Los Angeles, Chicago and Washington.

Besides providing new ideas, food companies must be aware of the possible effects of government regulations on food service. At this point, it remains unclear whether the food service sector will be covered by the Nutritional Labeling and Education Act (NLEA), according to a spokesperson from the NRA. "Most restaurateurs we have talked to say they would have to eliminate common descriptor terms like 'fresh,' 'light,' or 'reduced' from their menus because, as defined by FDA, they are unworkable for food service settings," said William P. Fisher, who delivered testimony on behalf of the NRA. The association wants separate regulations from the food manufacturing industry.

What does this have to do with you as a food manufacturer? Be aware and be ready for it! Food service operators report time and time again that they will only work with companies that are aware of their problems and offer solutions. This leads to another important point: Food companies can offer solutions, but they must be ready to deliver what they promise. A Pennsylvania baker had promised that he could deliver 2,000 fully-baked stuffed pitas to Villanova University Food Service, said registered dietician Carol Fagan. However, when the pitas arrived, they contained unexpected processed bacon bits, rather than the real thing. The pitas were rejected by the students and the baker lost the account.

Another area that is getting more attention from food service operators is recycling. McDonald's has launched a recycling program that it acknowledges is only successful as a result of the efforts of its suppliers. Rubbermaid, Winchester, VA, has collaborated with McDonald's and TriAce to source behind-the-counter low-density polyethylene (LDPE) film and high-density polyethylene (HDPE) rigid packaging. The material is converted into ready-to-mold raw pellets. Rubbermaid will use this reclaimed material at levels of 25 percent in its products and refuse containers it manufactures for McDonald's. Rubbermaid calls the program the most comprehensive institutional recycling program in the country since McDonald's provides both the source and market for the recycled products.

Supermarket frontier

A further refinement of this theme is demonstrated at Genuardi's Supermarkets, Norristown, PA. Supermarket delis are the new frontier in food service and smart companies are providing the service supermarkets want. While supermarket delis still represent a modest segment of total food service, real growth in 1991 was a healthy 6.5 percent, with retailers buying a total of $3.1 billion in food service merchandise, according to Technomic, Inc.

Bob Cappuccio, deli specialist at Genuardi, works with Kimberly Newhart, vice president administration, Newhart Foods, Allentown, PA, to develop prepared foods, such as wet salads, desserts and entrees. Each supermarket chain wants to develop its own prepared food products to make it unique compared to deli products offered by other chains, said Newhart. "Chains are tired of me-too products," she added.

Newhart helps supermarkets develop signature products just for that chain. A recent example is when Genuardi's Cappuccio wanted to spice up a macaroni salad and use larger chunks of vegetables in another type of salad. A total of six different salads were made and given a month-long test in two or three Genuardi supermarkets. "Four or five salads will be eliminated and we'll further develop the sixth, based on in-store

1992 Purchases: Food Service Food Purchases

Category	Purchases (Billions)
Quick service	$25.6
Restaurants	26.5
Convenience stores	2.3
General merchandisers	.64
Supermarket delis	3.4
Lodging	3.3
Recreation	3.2
Business	9.5
Health care	5.8
Vending machines	8.0
Primary and secondary schools	5.0
Colleges/universities	3.2
Airlines	2.4
Total	**106.8**

Source: Technomic, Inc.

Goodbye mystery meatloaf, hello two-percent milk

Remember the days of mystery meatloaf at the college cafeteria? Well, meatloaf has gotten the boot while two-percent milk and a wider selection of low-cal salad dressings have taken its place at Villanova University dining halls. Student input is taken very seriously and much of what students have to say has been integrated into the university's food service menu, according to Bill Stevenson, manager and Carol Fagan, nutritionist at Villanova University Food Services Department, Villanova, PA. The department serves 20 meals a week to 3,228 students.

Suggestions are written on napkins and tacked onto a suggestion bulletin board at the entrance to the dining hall. Stevenson also has excellent rapport with students which quickly becomes evident to a visitor as students tell him what they think. Some suggestions are completely subjective, such as the weakness or strength of the coffee. However, if Stevenson finds a substantial number of students confirming a suggestion, he'll make a change.

Meanwhile, student comments have resulted in the selection of low-cal salad dressings being increased from one to three, the addition of skim milk, more servings of chicken meals and low-cal desserts, such as *Weight Watchers* ice cream. The regular fat versions are available along side the low-fat.

Fagan meets with students once a month for an hour to find out what they want. A representative from each strata of college society is present: athletes, scholars, party animals, artists, and "the average student."

College dining halls run on a tight schedule. Meals are served at specific times and any company supplying a college food service organization must deliver product exactly when promised. Generally, dining halls have all they need to prepare meals a day in advance, however, produce for the salad bar and fresh bread is delivered daily. Companies delivering on a daily basis arrange a back-up system in the event the truck breaks down enroute.

An interesting quirk of life in college dining halls today is the increased preference for cold cereals—morning, noon and night. Stevenson said when he first noticed a run on the fifteen varieties of sweetened and unsweetened cereals, he observed whether students slipped the boxes into their jackets for a later snack. But he was surprised to see that the cereal is consumed with milk on the premises. Sometimes students will eat cold cereal as their meal or eat it after their lunch or dinner. *Apple Jacks* is the runaway favorite, he added.

Stevenson was enthusiastic about the coffee dispensing machine that uses liquid coffee concentrate rather than grinds. It is easier to maintain and reduces the need for a person to attend to coffee pots. Students also drink a lot of iced tea and other powdered beverages. Stevenson would like to see a more efficient way to mix the beverages rather than using five gallon containers that are poured into the dispensing machines.

Food Service Managers From Villanova Want:

- Cartons and boxes that clearly state the portion size and number of servings. (Stating poundage just doesn't help.)
- Shelf life labeling WITHOUT CODING! (Also, be sure to clarify whether it is a sell-by or consume-by date.)
- More resealable pouches.
- If you claim packaging is easy to rip open—make sure it is. (This is important when an operator must open 1200 bags.)
- Offer more bulk packaging containing 10-12 individual pieces. (Again, appreciation for this increases when serving 2,000+ diners.)
- Reduce the amount of packaging. (There is too much plastic wrap, boxes, portion papers, etc.)
- Put nutritional information on boxes so food service managers can show students who ask about this.
- Does anyone have a way to quickly chop tomatoes for tacos? (Without turning it to mush as most choppers will do.)

Source: Villanova University Food Service Managers.

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suggestions," said Cappuccio.

Cappuccio said he gets most of his ideas for unique deli offerings by traveling to different parts of the country. Genuardi's has tried balsamic vinegar-based salads, mozzarella cheese salads, parsleyed potatoes and orzo salads. However, "most people now look for the basics," Cappuccio said. Fried chicken, macaroni and cheese, and lasagna are the shoppers' well-established favorites, he said.

Cappuccio prefers to buy from suppliers who can offer fresh foods without preservatives since consumers prefer natural-sounding ingredients. However, people are not scrutinizing the label as closely as they were two years ago, he said. Taste has a priority over low-cal and low-salt claims, he

Hot fries, extruded as you wait

Although healthy foods are on a roll, people always like to revert to a few fattening favorites. And not everyone buys into the healthy eating trend as shown by the fact that fast food joints report that more than 23 percent of their sales are from french fries. This translates to $12 billion annually, according to Martin Balan, chairman of the board for Adelaide Robotic Technologies, Inc., Miami, FL. He has come up with a way to cash in on America's passion for fried tators and convenience—with a french fry vending machine.

Sam Balan, aerospace engineer who helped create the lunar module, designed the unit that cooks up a fresh batch of french fries every time. It works by reconstituting dehydrated potato, extruding it, and dropping the extruded pieces into hot canola oil. A customer gets approximately 33 fries for a buck.

By the summer, french fry vending machines will be popping up on military bases throughout the world, and agreements have been made with distributors in California, Pennsylvania, Canada, England, and France. Units are slotted for movie theatres, hospitals and schools.

Vending machine sales projected to increase 1.5 percent from 1991's $7.6 billion, according to Technomic, Inc. French fries join pizza (see *FE*, April 1992, page 106) as being America's top choices—now available at a touch of a button.

HOT FRESH
FRENCH
FRIES

added.

Ethnic specialities have been a great success in the fresh deli section, said Cappuccio, with Italian foods being the most popular. However, there is room for improvement. He would like a food company or packaging supplier to come up with a way to package fresh Chinese and Mexican entrees in microwaveable containers. Entrees that are microwaveable add to the customers' perception of value and increases sales of these items, he added.

The Cryovac Division of W.R. Grace & Co., Duncan, SC, has set up a retail sales plan to reach consumers looking for pre-cooked and ready-to-cook meat products. "Market managers recognize that the easier they can make it for their customers to cook meats, the more meat they can sell and at better margins," said Steve Karinshak, director of Cryovac Fresh Meat Packaging Systems. However, Karinshak recognizes that the retailer has little time to prepare these products. "The answer, we believe, will be to further centralize the fabrication of meats and to deliver more value-added products to the backroom that can go directly into trays or even directly into the case," he said.

Marinated products are the most frequently offered prepared meat products offered by retailers, Karinshak said. Marinated fajita strips, kabobs (beef, lamb and chicken), stuffed peppers (cabbage, mushrooms and cajun meat patties), marinated or stuffed pork chops and chicken are very popular.

Other more elaborate products include: rolled flank (stuffed with blue cheese), rolled pork (made with three cheeses, two types of ham and pork), cheeseburger mignon, spiced ground chuck, and adding bacon to patties.

New concepts that are coming from Marriott include display cooking of pastas and oriental cuisines, regional American cooking, strong emphasis on ethnic cuisine (with Indian, African, Spanish, Mexican, French and Carribean foods scheduled over the next few months) and vegetarian foods (such as tofu, veggie burgers and ethnic veggie), said Hill.

The opportunities for food companies in food service is limited only by your imagination. Take note of what food service operators want and what they need. With creativity and energy, you can change food service operator headaches into profitable markets for the operator *and yourself.* ▲

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CHILTON'S
JULY 1992

FOOD ENGINEERING

SINCE 1928; THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

TURNKEY OPERATIONS

READ IT & WIN
AD CONTEST
SEE PAGE 75

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FOOD ENGINEERING

ABOUT THE COVER

Over the years, "turnkey" has come to mean more than simply a passing of the keys from contractor to food processor. Now, relationships between the two often extend well beyond completion of the project.

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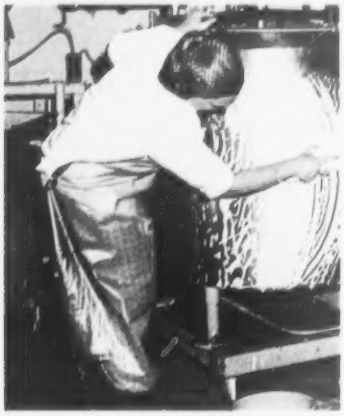

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READ IT & WIN

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It is still a stretch to call baked goods microwaveable. These products are plagued with quality problems such as sogginess, staleness or hardness. However, a new ingredient premix can help improve microwavability.

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Lowfat cheddar cheese needs more moisture but lower cooking temperatures than fullfat cheese. Rhône-Poulenc offers cultures and media that address these needs.

27 Marketplace—Cookies Shed Fat

The market for fat-free and salt-free foods has grown into a $700 million industry—a fact not lost upon cookie makers. Nabisco, for example, has formulated its 101-year-old Fig Newtons into a fat-free version.

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A cryogenic fresh air freezing system—new freezing technology for high-volume food processors—cools air through compression, heat exchange and expansion.

36 Remanufacturing Facility Opens Doors

Equipment Engineering Co. started up a new $4.3 million, 70,000 sq. ft. plant last March to remanufacture separators and other food-processing equipment.

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Consumers have made low-fat/low-calorie single-serving microwaveable foods one of the industry's fastest-growing market segments. A new generation of continuous-motion heat-seal machines now addresses this segment.

48 Accurate Liquid Nitrogen Dosing
The first product launched in the United States by the joint venture of Coca-Cola and Nestle S.A. (Coca-Cola Nestle Refreshments Company) is *Nestea Iced Tea*, a ready-to-drink beverage in an unusual package.

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A thermoforming system designed for the cost-effective production of retortable plastic containers offers melt phase forming as well as lower production costs and less manufacturing waste.

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American business isn't waiting for ratification of the proposed North American Free Trade Agreement linking the U.S., Canada, and Mexico. Already, the prospect of a borderless market has sparked investment and exports.

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In the strictest sense, sanitation means getting bacteria where they live. But that strategy requires a greater awareness of plant conditions, training practices and quality assurance plans.

78 Food Plants '92 Aims for New Records
Now in its seventh year, the Food Plants '92 annual conference will examine issues in food plant design, expansion, and renovation. *Food Engineering* will present its annual Plant-of-the-Year award at the event.

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AWARD-WINNING
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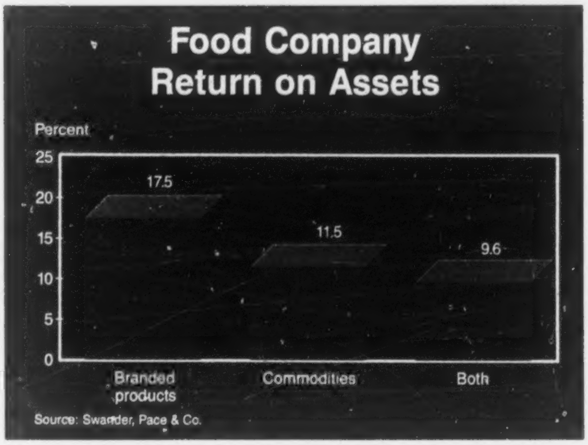
INDUSTRY REPORT

Balancing brands and private label kills profitability

Companies that simultaneously manage brands alongside existing commodity or private label operations are losing profits, according to a study completed by Swander, Pace & Co., San Francisco. The consulting firm analyzed the financial performance of 64 food companies (with annual sales between $85 million and $24 billion) from 1986-1991. The study compared companies that either primarily sold branded goods or commodities with those that, through product development or acquisition, tried to sell both.

Return on assets for branded products was 17.5 percent and for commodities, 11.5 percent. However, companies combining branded and commodity products realized a mere 9.6 percent return. Swander, Pace & Co. attributed the fallacy of combining brands with commodities to the fundamental differences that exist between each category's gross margins, marketing spending, sales force requirements and retail support.



Source: Swander, Pace & Co.

Companies selling branded products show the highest return on assets.

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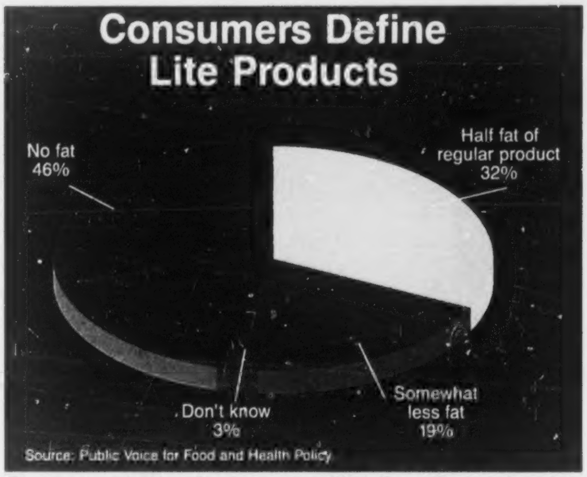
INDUSTRY REPORT

Blinded by lite: findings of consumer survey

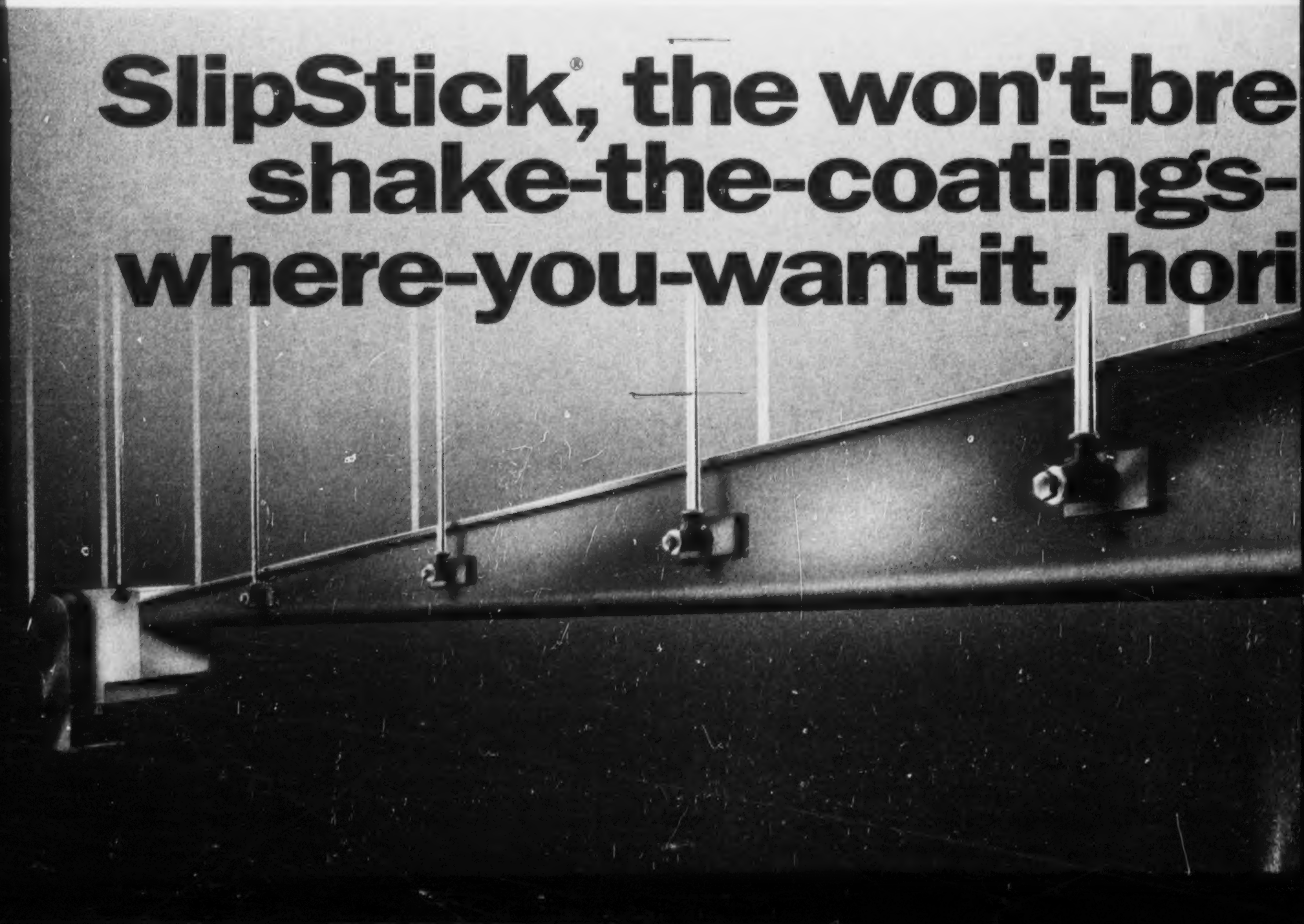
Nearly half the consumers responding to a poll sponsored by Public Voice for Food and Health Policy said the term "lite" should be used in reference to a low-fat or nonfat product, rather than as a generic term to indicate calories, cholesterol, salt, color or texture. The survey was conducted by the Survey Research Center at the University of Michigan (January 1992).

Public Voice said the Food and Drug Administration's (FDA) proposal—that "lite" foods feature a 50 percent reduction in fat, and the food industry's position— that "lite" should show a 33 percent reduction, both ignore what consumers want. Some 46 percent of those polled expect "lite" products to have almost no fat at all. Low-income and elderly consumers are more apt to think "lite" refers to having no fat at all, the survey concluded. The FDA stated within its proposal that the definition of "lite" should be based on the consumers' perception that it means reduced in calories.



Source: Public Voice for Food and Health Policy

The vast majority of consumers think lite refers to low-fat.



AMEXICANADA

ITS IMPACT ON FOOD

The prospect of 360 million consumers in a borderless market spurs "rationalization," investment and exports.

CHARLES E. MORRIS
MIDWEST EDITOR

American business isn't waiting for ratification of the proposed North American Free Trade Agreement (NAFTA) linking the U.S., Canada, and Mexico into a common market of 360 million consumers.

According to a new study entitled *A North American Common Market?*, published in April by Cleveland Consulting Associates (Cleveland, OH), no less than 87 percent of the 190 U.S. executives (representing 170 companies) responding say their companies are already doing business in Mexico. Eighty-four percent expect ratification of a Free Trade Agreement (FTA) with Mexico; and 76 percent believe the U.S. should pursue free-trade negotiations with other Central and South American nations.

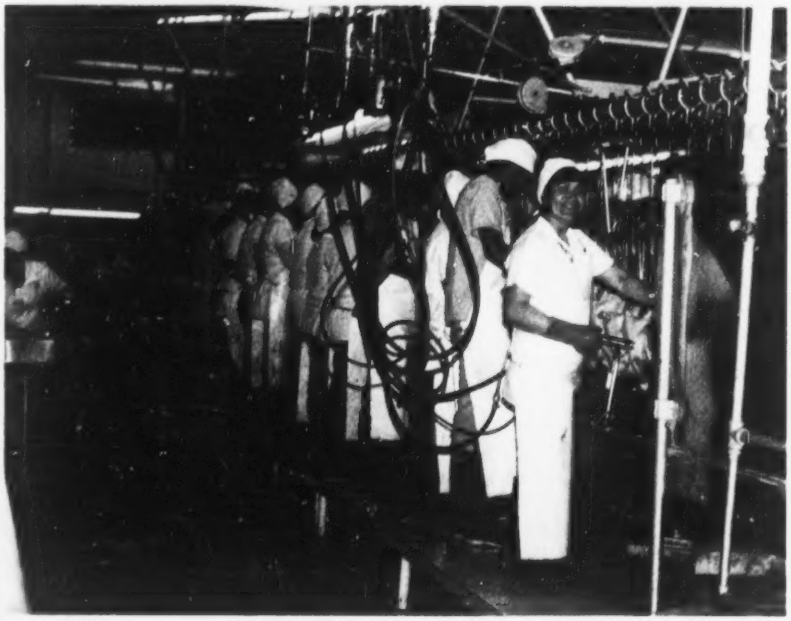
The CCA study also demolishes the perception that U.S. manufacturers see Mexico mainly as a source of cheap labor, and free trade as an opportunity to cut the cost of goods sold in the U.S. Eighty-five percent of the respondents cite access to a new market of 81 million consumers as the greatest benefit of free trade with Mexico, while only 13 percent list operating efficiencies as their top priority.

Most respondents recognize, however, that major benefits depend on "rationalizing" their North American operations—that is, consolidating or expanding manufacturing and distribution where necessary to eliminate duplication and optimize efficiency.

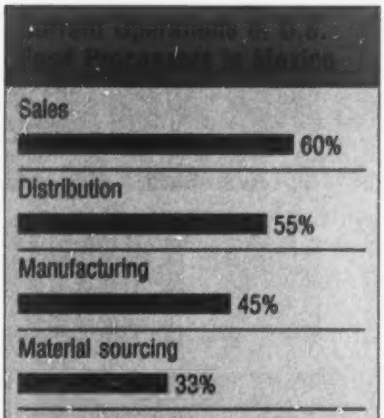
Food outlook

Of the 170 companies covered in the CCA survey, 58 are food-processing firms; 38 of these are *Fortune 500* members. Fifty-one operate in Canada; 49 currently do business in Mexico.

Since implementation of the U.S./Canada FTA, eight have increased ownership of Canadian subsidiaries, seven have entered new licensing agreements, five have executed mergers or acquisitions, and seven have entered new joint ventures. To

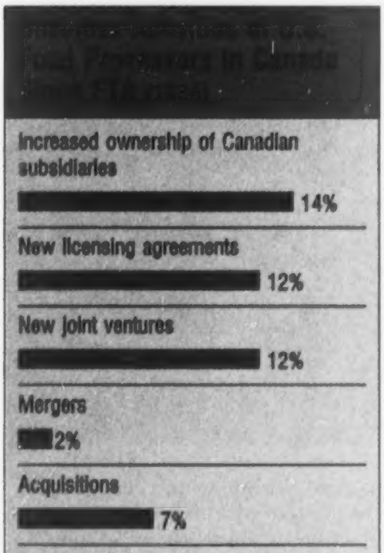


Grupo Trasgo, which accounts for 14 percent of Mexico's poultry production, is currently expanding operations with a $100-million U.S. investment. (Source: Mexican Investment Board.)



Of 58 food firms surveyed, most submitted multiple answers.

Source: Cleveland Consulting Associates.



Based on survey of 58 food processors.

Source: Cleveland Consulting Associates.

further boost efficiency in serving combined U.S./Canadian markets, 28 see opportunities to rationalize manufacturing plants, 41 to expand or rationalize distribution systems, and 15 for sourcing raw materials or components.

If an FTA with Mexico is approved by Congress, 31 would consider establishing new distribution systems in Mexico, 37 would set-up new sales functions, 22 would startup manufacturing plants, and 18 would source raw materials and components. Nine say they would eliminate or reduce similar activities in the U.S. or Canada, 38 say they would not.

If the proposed NAFTA is implemented to create a North American Common Market, 31 see opportunities to rationalize manufacturing, 44 would expand or rationalize distribution, 26 see new sources for raw materials or components.

Major stimulus for the burgeoning interest of American manufacturers in a NAFTA embracing Mexico: The unprecedented economic reforms instituted since the 1986 admission of Mexico to GATT (the General Agreement on Tariffs & Trade) and the 1988 election of President Carlos Salinas de Gortari. To pave the way for a free-trade agreement with the U.S., Mexico has reduced its maximum tariff rate, substituted tariffs for non-tariff barriers on many products, dropped import licensing requirements on several agricultural and processed-food products, liberalized investment policies to allow up to 49-percent foreign ownership of agricultural land and 100-percent foreign ownership in other economic sectors, and restructured its foreign debt.

According to the Mexican Investment Board (MIB), a joint government/private-banking venture which promotes foreign investment in Mexico, these reforms have to date reduced state ownership from 1,600 to 200 companies, slashed the annual inflation rate from 160 percent in 1987 to 19 percent in 1991, and boosted direct foreign investment in Mexico from $2.5 billion in 1989 to $4.8 billion in 1991 for a cumulative total of about $35.8 billion.

Recent predictions in the horizontal business press that a North American Free Trade Agreement will be reached this summer, however, are "highly speculative," cautions Harry Schmick of the Foreign Agricultural Service at USDA. NAFTA negotiations, conducted from the American side by U.S. Trade Representative Carla Hill's office, involve 19 different negotiating groups, each covering a different sector such as tariffs, automotive, agriculture, standards (e.g., health and sanitation), transportation, telecommunications, investment and financial services.

"Some of these groups are close to agreement, but others have a way to go," Schmick observes. Example: The U.S. and Mexico want a comprehensive agreement phasing-out all agricultural tariff and non-tariff barriers, but Canada wants to protect certain industries such as dairy and poultry (not covered under the U.S./Canada FTA).

'Plant-specific' strategies

Consensus of sources contacted by *Food Engineering*: The U.S./Canada Free Trade Agreement, which took effect Jan. 1, 1989, may be accelerating rationalization of food companies on both sides of the border to some degree, but this trend was well underway in both nations during the "mergermania" of the late 1980s. "There was a lot of consolidation going on both before and after the FTA, so consolidation isn't due to the FTA alone," observes Dr. Charles R. Handy, section leader in the Economic Research Service at USDA.

"Long-term restructuring was going on anyway, so it's hard to separate the two," agrees Odette Vaughan, who tracks Canadian food mergers and acquisitions at the Policy Branch of Agriculture Canada, Ottawa. "And there are other factors involved as well, including GATT and multinational corporate strategies relating to EC '92."

Example: Campbell Soup Company's 1991 $160-million repurchase of the 29-percent publicly-held shares in its Canadian subsidiary Campbell Soup Co. Ltd., and the integration of Campbell Canada with Campbell USA to form Campbell North America. Because the FTA changed Canadian regulations to allow 100-percent U.S. ownership of Canadian firms, this move seemed to be sparked by the FTA but "it would have happened anyway," says Campbell spokesman James H. Moran.

The move actually anticipates a North American common market: Campbell followed-up last January by combining Campbell North America with its Mexican and Argentine operations into Campbell North & South America "to take stronger advantage of an emerging three-country North America trading bloc," wrote President & CEO David W. Johnson in the company's second quarter '92 financial report.

Vaughan sees corporate rationalization strategies in the wake of the Canada/U.S. Trade Agreement (or CUSTA, as FTA is known in Canada) as "plant-specific" rather than corporate or country-specific.

"Typically, before CUSTA, U.S. food companies opened Canadian plants to avoid tariffs," Vaughan points out. "But now that tariffs are being phased out, other factors come into play, such as labor costs and distribution."

Because the Canadian population is concentrated in a long, narrow East-West strip along the U.S. border, food companies will consolidate plants on both sides: In some cases a Canadian plant will be better situated to serve certain U.S. markets, in other cases a U.S. plant will be better positioned to ship to Canadian markets. "The province of Ontario will be a clear winner because of its location," adds James H. Gilmore of CCA.

In general, however, Gilmore sees manufacturing of value-added food products shifting more to the U.S. and production of lesser value-added products to Canada. Example: Proctor & Gamble's shift of *Duncan Hines* cake-mix production for Canada to its plant at Jackson, TN.

Rationalization gathers steam

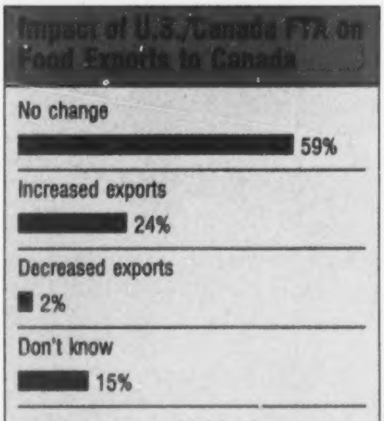
Whether spurred by the FTA or not, U.S. and Canadian firms continue to rationalize operations in varying ways on both sides of the border. Recent examples reported by food-research officers Roseanne Hill and Monica Treidlinger at Agriculture Canada, and culled from corporate reports by *Food Engineering*:

- Gerber shut-down its baby-food plant at Niagara Falls, ON and shifted production for the Canadian market to its plant at Fremont, MI.
- Kellogg set up a new division called Kellogg North America embracing Kellogg Canada and Kellogg USA, which nevertheless remain separate entities. The new division continues to invest in all six of its cereal plants including the Canadian operation at London, ON, says Kellogg.
- Borden closed its 100 year-old plant at Ingersoll, ON, shifting con-

Mexican cookies aim at U.S. markets

FINEZZA
FINEZZA

Backed by parent Pepsico, Mexico's Empresas Gamesa set up G&S Foods Corp. (Los Angeles) in May to launch "a two-pronged expansion program" aimed at both the Hispanic and mainstream economy-cookie markets in the U.S. G&S is marketing the upgraded *Gamesa* line of cookies and crackers for the Hispanic-foods section of the supermarket, plus the new *G&S* line for the regular cookie shelf. Vertical integration, whereby Gasmesa controls the entire process from raw-material production to delivery of the packaged product "gives us an unusual ability to offer both total quality control and cost advantages," explains G&S National Sales Manager Chuck Curtis.



Based on survey of 58 food processors.

Source: Cleveland Consulting Associates.

U.S. Direct Investment in Foreign Food/Beverage Industry (Millions of dollars)

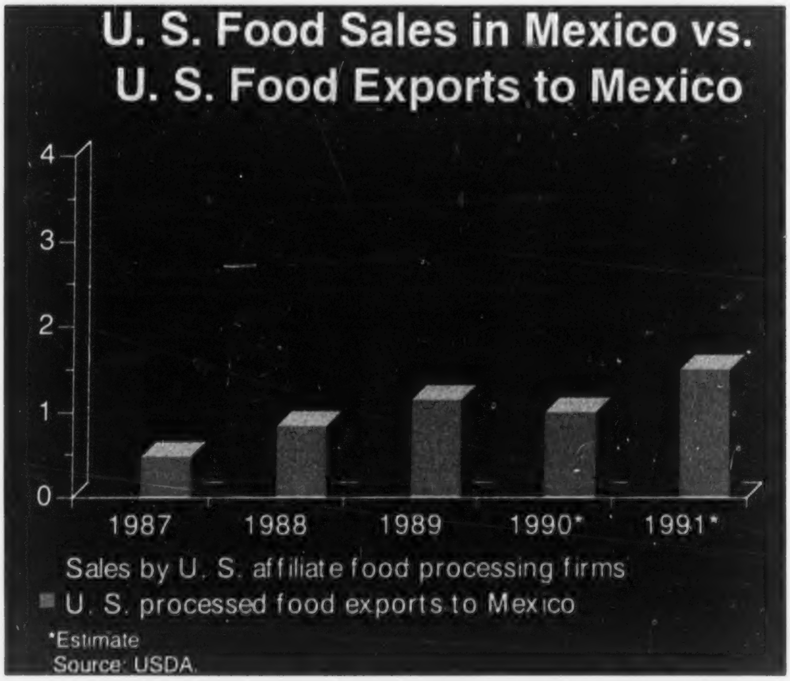
	1987	1991^1
Canada	1,829	2,471
Mexico	210	1,490
Japan	371	394
Europe	7,414	8,912
Rest of world	2,858	4,262
All countries	12,682	17,529

^{1}Estimated.

Source: U.S. Dept. of Commerce.

densed milk production to a new plant at Montreal and non-dairy products to U.S. plants, and shut-down pasta plants at Toronto and Winnipeg, shifting 75-percent of Winnipeg production to Lethbridge, Alberta and the rest to U.S. plants.

- Nabisco shut down a plant at Simcoe, ON but invested $2 million in its plant at Exeter, ON.
- International Multifoods is building a new bakery-mix plant at Toronto "to take advantage of the expanded markets that free trade is expected to bring."
- Cargill commenced a $4-million expansion of its beef-processing plant at High River, Alberta, to capture new export opportunities to the U.S. and Japan.



*Estimate
Source: USDA

- William Neilson invested $3 million in new equipment to produce chocolate bars for U.S. markets.
- CSP and Central Soya of Canada merged, then purchased the vegetable-oil division of Canada Packers to create CanAmerica Foods, Canada's largest oilseed processor with 3 percent of the U.S. market.
- Culinar, Inc. (Montreal) acquired Drake Bakeries (Wayne, NJ) for access to the Northeastern U.S.
- The bakery-products division of H.J. Heinz, based at Leamington, ON with 12 plants in the U.S. and Canada, acquired four frozen baked goods firms – two in Canada and two in the U.S. Heinz itself purchased J.L. Foods, the frozen foods division of John LaBatt based in Eugene OR (and including Olmstead Foods of Wheatley, ON) and shut down a StarKist tuna cannery in New Brunswick.

According to Treidlinger, CUSTA has opened niche-market opportunities in the U.S. for some smaller Canadian processors. Example: Pasta Plus plans to open the first of 25 U.S. fast-food franchises in Boston later this year, supplying franchisees from its plant at St. John's, Newfoundland.

CUSTA has also spurred U.S. investment in the Canadian food industry, Vaughan reports. From 1982-89, U.S. direct investment in the Canadian food industry increased by an average of 5 percent per year. After declining by 13 percent in 1988 (probably due to uncertainty about the pending CUSTA), U.S. investment in the Canadian food industry surged by 6.6 percent in 1989 and another 13.6 percent in 1990. This could portend a greater flow of products from Canada to the U.S., Vaughan observes. "CUSTA is not having a negative impact on the Canadian food industry," she concludes.

Since value-added foods carried higher tariffs than raw materials, the tariff phase-out called for by the FTA has already boosted U.S. exports of processed foods to Canada. According to Economist William V. Janis at the U.S. Dept. of Commerce, U.S. processed-food exports to Canada soared from $1.41 billion in 1989 to $2.63 billion in 1990 to $3.01 billion in 1991. Processed fruits and vegetables led the way, zooming from $191 million in '89 to $408 million in '90 and $485 million last year. Reasons, says Janis: 1.) higher costs of production due to shorter growing seasons in Canada; 2.) more fragmented markets, with some more easily reached from the U.S.; 3.) greater government intervention to prop agricultural prices in Canada, causing higher raw-material costs for processors.

Investment in Mexico booms

According to the CCA study, the major deterrents to trade with Mexico are its inadequate transportation infrastructure, its's foreign capital rules, and currency instability. As noted earlier, the latter two are being addressed by Mexican economic reforms and are improving. To upgrade transportation facilities, the Salinas administration has privatized road construction and is pumping more than $1 billion per year into overhauling the state-owned rail system, with technical support from U.S. rail carriers. Negotiations are expected to ease Mexican transport regulations, which currently require transferring shipments from American to Mexican carriers at the border.

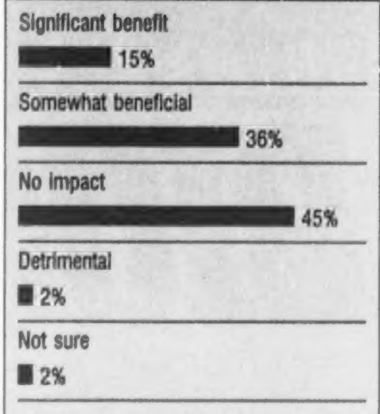
U.S. food processors operating in Mexico and surveyed by CCA rate the productivity, quality, labor stability, delivery reliability, manufacturing costs and management capabilities of their Mexican operations as "good." Only one category surveyed—engineering capabilities—is considered "marginal."

The improving economic climate coupled with bright prospects for NAFTA is dramatically stimulating U.S. investment in the Mexican food industry. According to the Dept. of Commerce, U.S. direct investment in the Mexican food industry soared more than 700 percent from $210 million in 1987 to an estimated $1.49 billion last year. According to USDA's Chuck Handy, U.S. processed food and feed exports to Mexico nearly doubled from $887 million in 1988 to $1.5 billion in 1991, but direct investment by U.S. processors in their Mexican affiliates helped boost affiliate sales to $4.1 billion—nearly three times higher than exports!

Recent examples of U.S. investment and rationalization in Mexico, as reported by USDA, the MIB or the companies themselves:

- Pepsico in Oct. '90 acquired 54-percent interest in cookie baker Gamesa (see sidebar), with whom it had earlier formed a joint venture to raise wheat and beans as raw materials in association with communal farmers and small landowners.
- Pepsico and snack-foods partner Sabritas invested $44 million last year in two new plants, with further expansion planned this year.
- Campbell's canned-foods plant in Paris, TX ships some products into Northern Mexico, while its canned/frozen-vegetables plant at Villagran, Mexico ships some products into Southern California.
- Tyson entered into a joint venture with poultry processor Grupo Trasgo and C. Itoh & Co. whereby Tyson provides technology and technical assistance to a $60-million Trasgo investment in chicken production by communal farmers. Itoh markets about 50 percent of the processed chickens in Japan.
- Sara Lee entered a joint venture with Grupo Industrial Bimbo, Mexico's largest baker and one of the few Mexican firms with a national distribution network, whereby Bimbo will distribute Sara Lee bakery and processed-meat products in Mexico while Sara Lee distributes Bimbo bakery products in the U.S.
- Tropicana has two projects totaling $14 million, one privately-owned and one in partnership with farmers, to produce and market oranges. Procigo, a Mexican firm, will process oranges into juice, which Tropicana will market in Mexico and foreign markets.
- Green Giant (Grand Metropolitan) started-up a $16-million wholly-owned, vertically-integrated vegetable processing and packaging facility in the state of Guanajuato.
- Ralston-Purina, which has operated feed plants in Mexico for 35 years, recently started-up a new feed plant at Monterrey and a pet-food plant near Mexico City. ▲

Impact of U.S./Canada FTA on U.S. Food Processors



Based on survey of 58 food processors.
Source: Cleveland Consulting Associates.

SPECIAL
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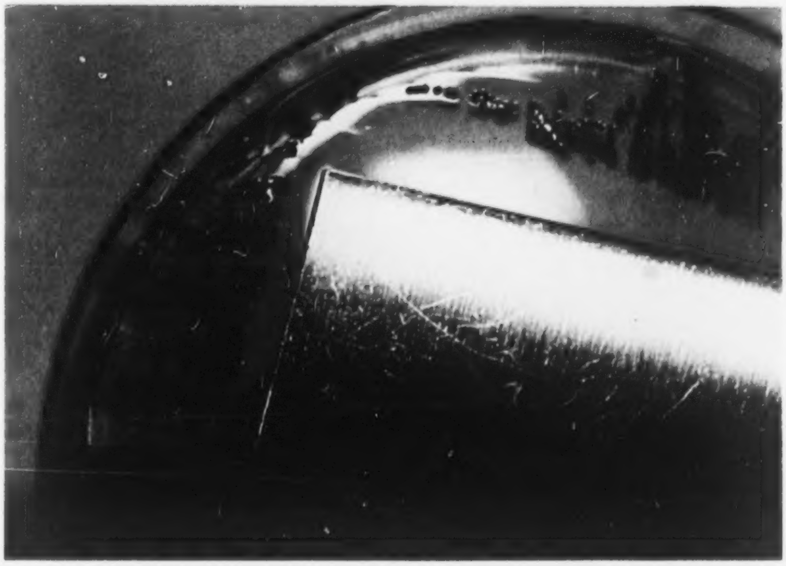
SANITATION

SANITATION:

HOW TO COMMIT BIOCIDE



If a sanitation program is effective, there will be no growth surrounding the sanitized area. (Source: Diversey's International Biocide Lab.)

In the strictest sense, sanitation means getting bacteria where they live. But that requires a greater awareness of plant conditions, training practices and QA plans.

LETICIA MANCINI
TECHNICAL EDITOR

"Sanitation tools aren't new," said Bob Richardson, manager of inspection services for General Mills to an audience of sanitarians at last October's DFISA show, "You know what to do with foam cleaners and the like. However, we as an industry haven't figured out how to put it all together."

Richardson was describing problems with executing sanitation at food plants. Every plant has some type of program; every plant thinks they're doing it right. But still there are quality and contamination problems. The thousands of recalls of diverse food products for *Listeria, Salmonella* and *Staph* contamination every year are proof of that.

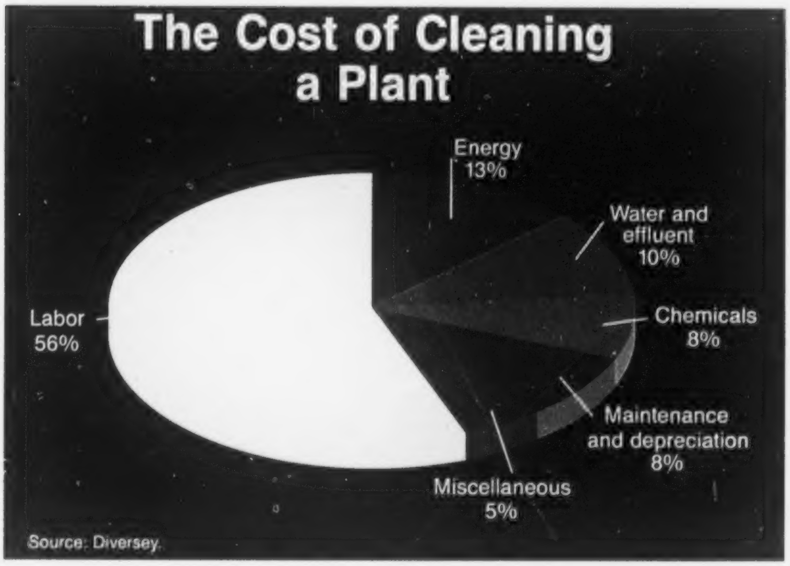
The technology to combat bacterial contamination is there (and is always improving), but without a greater understanding of microorganisms, it is ineffective. However, food companies are not without hope. Problems can be solved fairly simply by taking a good hard look around the plant.

Listeria hysteria

Now for the bad news: many types of bacteria can attach firmly to all types of food processing surfaces, including rubber, stainless steel and Teflon. Without proper attention, gooey biofilms can form, spelling disaster in the form of contaminated product.

According to Diversey Wyandotte Corporation's International Biocide Laboratory (Wyandotte, MI), 5 to 10 percent of foodborne poisoning outbreaks are caused by improperly cleaned food processing equipment. One organism that strikes fear in the heart of many is *Listeria monocytogenes*, because it is so pervasive. Listeria poisoning, or listeriosis, is almost always severe, and sometimes fatal.

This organism has the ability to withstand heat, acidic conditions and high salt concentrations. But its most frightening aspect is that it can thrive at temperatures as low as 0°C and can survive temperatures as high as 82°C, which indicates it can withstand some



Since labor is over half the cost of a sanitation program, it is imperative that workers be properly trained.

cooking processes.

Still, proper cleaning cannot be emphasized enough in the control of Listeria. If biofilms are destroyed completely with cleaners, there will be no contamination. However, if surfaces are *not* completely cleaned, sanitizing them won't help. Researchers at Campbell Soup have documented that Listeria is resistant to a number of sanitizing chemicals on a variety of surfaces. In the case of Listeria, the old saying "You can't sanitize a dirty surface" has never been more true.

"Listeria has taught us that some previously sound principles are not so," commented Dr. Don Zink, Quality Assurance and Product Safety manager at Nestle USA, to the same DFISA audience. Zink explained that Listeria is present in all plants, thriving in drains, warehouses and standing water. More attention must be placed on environmental control, he said, especially on preventing cross contamination.

Spotting trouble

"Be innovative and persistent when looking for sources of contamination," said Zink. For instance, segregating raw ingredients and processing areas, and limiting human and forklift traffic between them, can improve matters. Free movement of employees can be monitored by using different colored uniforms. And keep forklifts clean and separate. "What good are sanitizing dips for workboots when they will be placed on dirty forklifts?" he said.

The FDA also calls for the segregation of brushes for food contact and non-contact surfaces. Here, Sparta Brush's (Sparta, WI) new *Tri-Zone* color coded brushes can help. In the Tri-Zone program, red brushes are used for raw food areas, white for processing areas, and yellow for general custodial use. A fourth brush, black, is used for floor drains, a favorite hiding place for Listeria.

Even routine maintenance cannot be ignored. All rubber gaskets should be replaced once a month, before cracks appear that harbor bacteria.

But a little detective work can be a sanitarian's most important weapon in the battle against Listeria, says L. B. Guzzo, technical manager at Oakite Products (Berkeley Heights, NJ). He relates this anecdote: "I worked with a dairy that had a continuing Listeria problem. They were constantly pouring chlorine down the drain. Their swab tests continued to come up negative, but product would still be contaminated. Finally, we discovered that the problem was due to a mechanic using a filthy grease gun to fix all the clean machines, and touching everything." That practice came to an immediate stop.

According to Guzzo, chlorinated foamers are most effective against Listeria. Oakite markets *FiChlor Foam HD*, a high-foaming heavy duty chlorinated foam for cleaning stainless steel surfaces, and *FiSan ACF* for aluminum surfaces.

Mal Sorgenfri, vp of R&D at Alex Fergusson (Frazer, PA) suggests using quat-based sanitizers to follow. The company markets a unique product, the *Power Block*, to be placed in drains after cleaning. It is quat-based, but it is a solid, so that when water flows over it, a small portion dissolves to keep Listeria under control.

And there is a new type of sanitizer from Klenzade (St. Paul, MN) made from peroxyacetic acid. *Oxonia Active* was developed for CIP sanitizing and provides killing activity in water temperatures as low as 40°F. The product is also biodegradable under normal waste treatment.

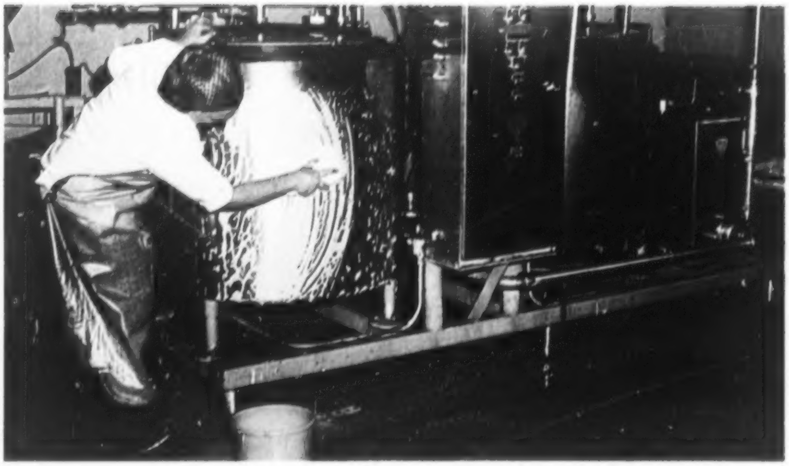
Improving training

But using the right product doesn't do much good if it is used incorrectly. Half of all sanitation costs are labor, but sanitation workers are probably a food plant's most neglected resource. They are extremely important when it comes to controlling contamination.

"Somebody has to supervise how cleaning procedures are taught," commented Dick Bakka, director of technical services at Klenzade. "All too often you have Joe Blow teaching some other guy how to clean equipment. The new guy picks up all of Joe's bad habits." Bakka advocates getting cleaning procedures written down, including what chemicals to use and in what concentrations, and keeping them in a bound notebook in a central location. Supervisors should retrain workers, if needed, and supervise the training of new workers.

Klenzade has recognized the importance of properly trained workers in the development of their *QUASAR* program. The program, an acronym for Quality, Assurance, Answers and Results, details what chemicals a plant might need, and how to use them. Special care is taken so the worker is not overexposed to chemicals. An important part of the QUASAR program is *Quorum*, a full line of chemicals that utilizes colors rather than names on its labels. The product labels are also bilingual, which makes training easier and less variable.

Sometimes the sanitation supervisor is in need of training. Here, Dennis Bogart of Diversey Wyandotte takes a hard line: "Most sanitarians are not educated well enough in food and spoilage microbiology. There is a tremendous amount of myth about how to get rid of bacteria." Diversey publishes a manual, *TACT WINS*, that can be used to train supervisors about the fundamentals of cleaning. The manual outlines the principles of time, action, chemical concentration, temperature, water, individual employees, nature of soil and surface to be cleaned (tact wins) and their cumulative effects on bacteria.



Ward off potential contamination. Make sure employees don't use the same brushes on food contact and non-contact surfaces. (Source: Diversey Wyandotte.)

Getting crews to understand the principles of microbiology is a different matter. Experts advise sending sanitation workers into the plant, armed with petri dishes, to conduct swabbing tests. "When they do the testing and incubating themselves, sanitation workers gain a greater appreciation of organisms and what they can do," noted Nestle's Don Zink. One food safety manager likes to take a blacklight into the plant to show crews the flourescing bacteria they missed during cleaning. All surveyed said that training was the weakest part of sanitation programs, but when employees are approached with respect, they show a greater commitment to learning.

Good QA sampling

The third important part of sanitation is developing an adequate microbiological sampling and testing plan. Are you doing the right tests? Are they still critical? If QA reports negative results or low counts, but quality problems continue, the current testing programs must be overhauled.

Rather than step up testing of product, increase environmental testing in the plant. This way, the absence or presence of pathogens can be determined as well as the location of microbial growth pockets. For instance, floor drains, which are always wet, should be sampled and tested. If pathogens are found, tests of the entire "watershed" are warranted. Also, metal-to-metal surfaces, cracks and crevices, undersides of mats and insulation on pipes should be monitored to confirm that they are not growth pockets. Do not overlook standing water, peeling paint, compressed air lines, wooden-handled tools or equipment repaired with tape.

When sampling, it is important to use good aseptic technique. There are several different methods of sponge sampling, depending on whether the surface to be sampled is wet or dry. If you are unsure of how to sample correctly, independent testing labs can explain the correct technique.

Prior to testing, equipment should be dismantled to expose nooks which may harbor bacteria. As an indication of how effective a cleaning and sanitizing program is, samples from equipment can be collected after cleaning, and compared to samples taken before cleaning.

Silliker Labs in Chicago Heights, IL recommends testing environmental samples first for aerobic plate count or coliforms. Not only are the tests useful for ferreting out microbial growth, they reveal sites that could support pathogenic organisms. These tests can be done at relatively little cost, compared to pathogen testing.

If it sounds like environmental testing can be as complex as a military battleplan, it is. But when sources of contamination are found, then systematically eliminated, proper cleaning by properly trained workers is all that is needed to keep bacteria under control. ▲

SPECIAL
EMPHASIS:
SANITATION

Does your plant pass the white glove test?

What's right with this picture? The plant shown, American Packaging's Bag Division headquarters in Story City, IA, has received a superior rating in the "White Glove" inspection for cleanliness and sanitary conditions given by the American Institute of Baking.

This voluntary inspection is extremely critical, and is based on five criteria: adequacy of sanitation program, pest control, operational methods and personnel practices, maintenance for sanitation, and cleaning practices. A plant needs to score at least 900 out of a possible 1000 points to receive the superior rating. American Packaging scored an exemplary 915 points. The company did especially well in the cleaning practices category.

Does your plant or your supplier's plant pass muster? According to AIB's consolidated standards for packaging facilities, cleaning tasks should be divided into three general areas. First, there is the daily, or cosmetic cleaning, that should be done every day as part of each individual employee's work assignment. Secondly, deep cleaning should be listed frequently on a master schedule. This cleaning is essential in eliminating dust and other soils that contaminate the containers. The third type of cleaning includes electrical systems and other difficult-to-clean equipment.

Don't forget to include lavatories, offices, water fountains and trash containers in daily cleaning. In addition, floor drains should be cleaned at least on a weekly basis, and employee lockers should be cleaned at least monthly. White lines (for determination of pest problems) should be scrubbed frequently to keep them free of dust and stains, as well as pest evidence.

The AIB also requires that formal records are to be kept for all cleaning and maintenance practices, as well as developing written cleaning procedures for all production equipment, including the use of cleaning chemicals. Facilities scoring above satisfactory levels are awarded a Certificate of Achievement by the AIB.

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FOOD ENGINEERING

ABOUT THE COVER

Although stalled by a recent string of failures, efforts by U.S. food companies to provide the table with fresh refrigerated foods are being renewed—this time by smaller companies seeking to avoid past mistakes.
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SPECIAL EMPHASIS

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18 Ready for Crawfish-analog Jambalaya?

The IFT annual meeting and Food Expo held in the New Orleans June 20-24 featured healthy and lowfat foods in a city where it's so easy to overindulge.

20 Clear Flavors for 'Healthy' Beverages

Several flavor houses exhibiting at IFT poured samples of clear carbonated beverages with unexpected flavors.

20 Marketplace—Fruits Replace Fat

One surprise at IFT had to be the low-fat cookies and brownies made with a puree of plums, dates, and grapes.

22 Complex Cheese Ingredients Developed

Signature cheese flavors are now possible, thanks to Kerry Ingredients' "fourth generation" technology.

29 Choices—Hung Up on Money Questions?

I was taught never to ask how much something costs, but this rule of etiquette can stifle decision-making.

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42 Cyclodextrins Remove Eggs' Cholesterol

Simply Eggs—liquid whole eggs with 80 percent less cholesterol than shell eggs—is the first U.S. commercial application of cyclodextrins to food processing.

43 GIA '92 Expects 70,000 Visitors

Paris will host GIA '92, the International Exhibition of Machinery for the Food & Beverage Industry.

46 FMC Adds Italian Equipment

FMC Corp. has added processing and packaging equipment lines through joint ventures with two Italian firms.

48 Online—Theory vs. Practice
We sometimes hear disparaging comments about researchers and their ivory tower approach to problems, but is there really a gap between theory and practice?

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54 Corn Mill Installs Metal Detectors
With the development of vendor certification programs, bulk material providers are being encouraged to develop quality assurance programs incorporating metal detection.

56 Gravity-fed Bottle Makes Its Debut
A bottle was designed for people who dislike leaving that last little bit of food in the bottom of a container.

58 Packintec Draws a Crowd in Milan
Despite worldwide economic hard times, the second Packintec, held in Milan, Italy, drew over 22,000 visitors.

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65 Keeping the Faith in Fresh
Companies that tried in the past to sell fresh refrigerated foods met failure. New firms, however, are trying again.

71 Packaging Clients' Needs
If you need a rush order for a test market or lack capital for new equipment, try contacting a contract packager.

77 Engineering Flavors For Low-Fat Foods
Fat performs many functions in foods. The challenge to a flavorist is to create flavors compatible with fat replacers.

83 Managing the Lab for Peak Performance
Today's managers, particularly in the technical fields, need different skills than their predecessors.

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INDUSTRY REPORT

Kessler blasts lackey concept of FDA ...

Consumers Give "Thumbs Up" to Biotech

Consumer Response	Favorable	Very Favorable
Expressing their impression of biotech—before discussion	70%	10%
Expressing their impression of biotech—after discussion	78	15
View of biotechnology to increase milk production		70
View of biotechnology to produce lower-fat meat		91

Source: Institute of Food Technologists.

During his keynote address at the annual meeting of the Institute of Food Technologists (IFT) in New Orleans on June 20, David Kessler, commissioner of the Food and Drug Administration (FDA) totally denied any insinuation that the FDA policy towards biotechnology makes the agency a lackey for the food industry.

He was referring to the FDA's recently announced policy that grants automatic approval of biotechnologically-produced foods that result in substances that already have been approved. Only substances that lack a history of safe use will be required to undergo the usual approval process. Kessler also addressed food allergies: "We specify that, if genetic material is transferred from a food source that is known to be commonly allergenic, the developer has two choices: either prove that the allergenic property has not been transferred or label the new food to alert consumers to its potential allergenicity." (Continued on page 13.)

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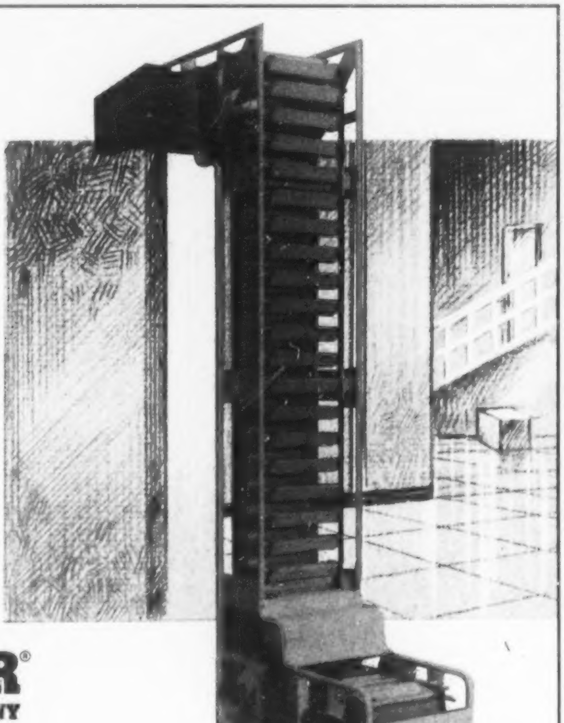

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... while reviewing FDA policies ...

FDA is still formulating policy regarding whether vegetarians should be alerted when a food crop contains a trait derived from an animal source or how information should be provided to people with special religious dietary constraints.

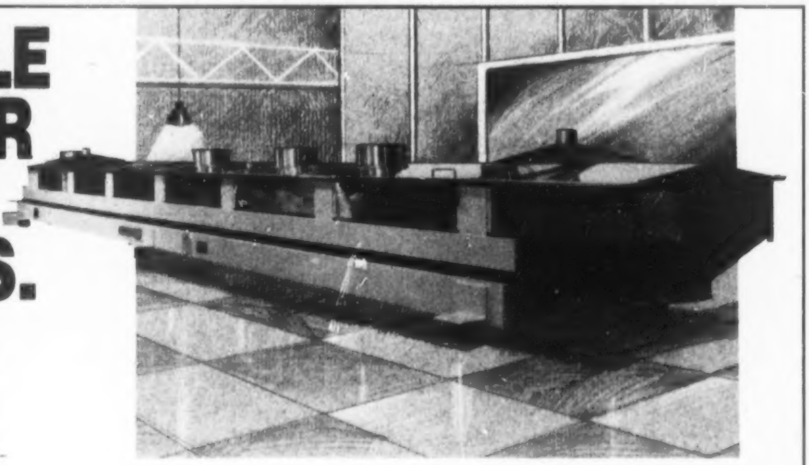
Stuart Pape, attorney at the Washington, DC law firm of Patton, Boggs & Blow, told FE that he **foresees "more Balkanization"** of biotechnology regulations as states react to the newly announced FDA policy regarding biotechnologically-produced foods. This could quite possibly result in Congressional hearings and federal legislation regarding biotechnology, he added. Pape spoke at a breakfast hosted by Hazelton at the IFT annual meeting in New Orleans.

... and praising NLEA as a "shot in the arm"

Kessler also praised the Nutrition Labeling and Education Act (NLEA) as being a "pro-information statute" that will **give industry an incentive to develop nutritionally improved foods.** Kessler indicated that the FDA will give industry room to cut fat in traditionally high fat foods, such as sour cream, and use descriptors such as low-fat sour cream. He also outlined planned changes at the agency that would **delegate decision making further down** the organizational chart. Also, the National Center for Toxicological Research (NCTR) is negotiating to develop an improved bioassay program to reduce the uncertainty in risk assessment for certain chemicals. The FDA is also considering forming a Science Board comprising eight or ten of the nation's top scientists to advise the agency.

A **Food Advisory Committee** that will also provide advice to the FDA is being assembled, with four out of 24 seats reserved for industry (and an additional four seats for consumer representatives.)

Responding to a question from FE, Kessler said the agency has recommended instituting **a nine month extension** to the May 1993 effective date of the NLEA (pushing it back to February 1994). Stuart Pape (see above story) said substantial changes will be made to the NLEA as a result of comments received by the FDA.



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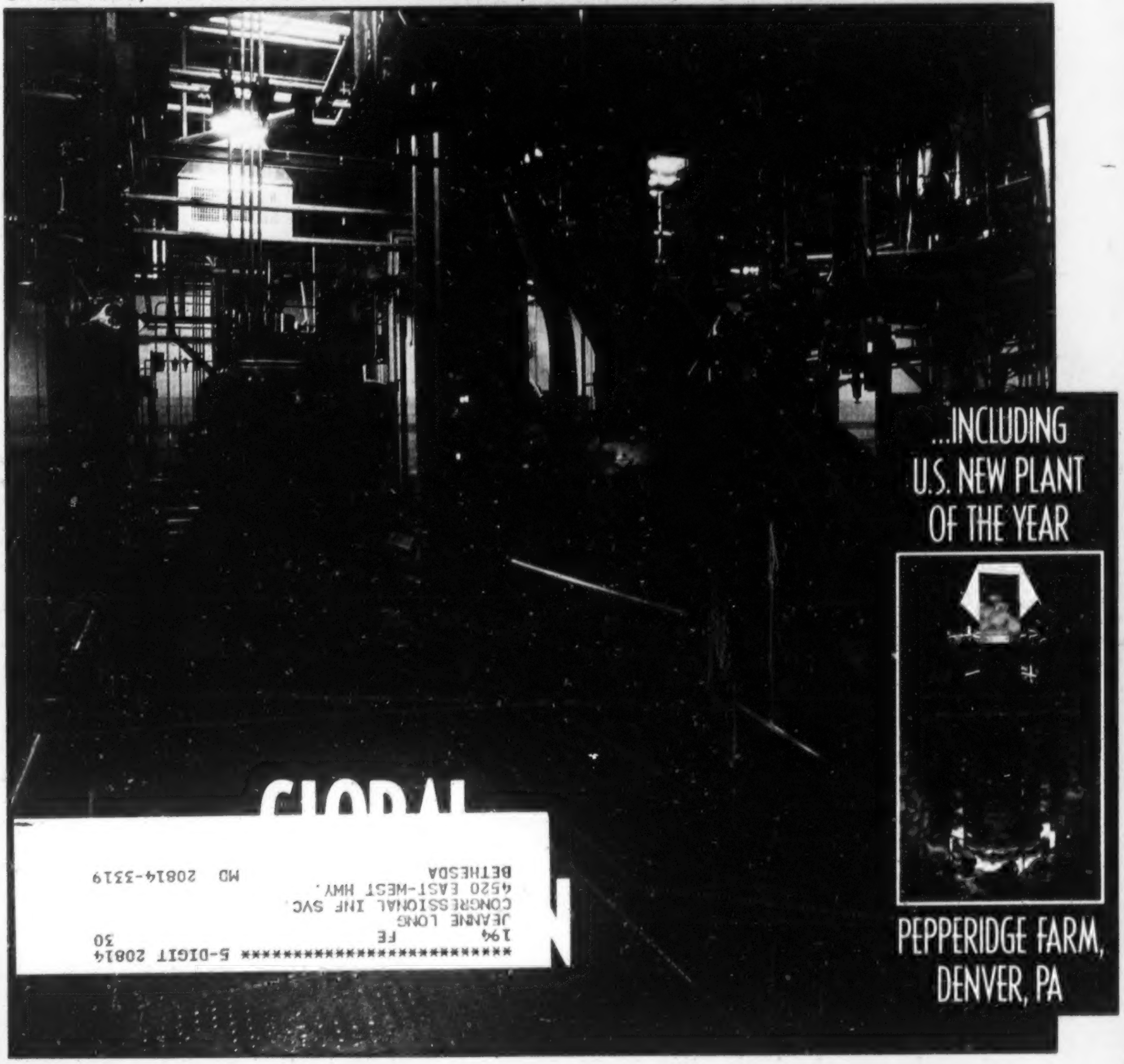

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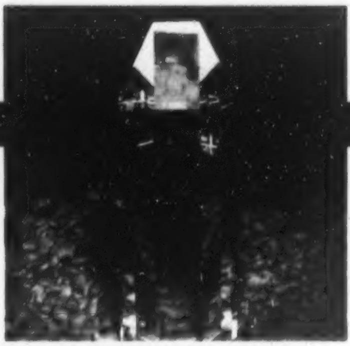

ABOUT THE COVER

Amid stiff competition, Pepperidge Farm's Denver, PA facility has been selected U.S. New Plant of the Year. The plant's state-of-the-art biscuit mixing area and its winning trophy grace the cover.
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SPECIAL EMPHASIS

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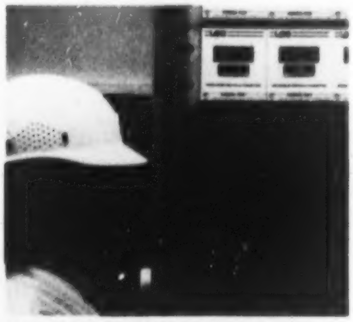

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ENGINEERED FOODS

20 Biological Advances Improve Oil Stability
In light of recent nutrition and lipid research, monounsaturated fatty acids seem to sit easily astride the fence between nutritional value and oxidative stability.

22 Nonfat Dairy Products Cut Fat in Pizza
Two new products from Kraft Food Ingredients are designed to make treats such as cheesecake and pizza easier on the waistline.

22 Marketplace—Fine Italian Foods
Italian food has always been the most popular ethnic fare. Products offered at the Fancy Food show in late July provided new twists to old Italian favorites.

27 Improving Deli Hams with Carrageenan
This fall, it looks like carrageenan will finally be permitted in water-added hams sold in the U.S. Its use should significantly improve the eating quality of hams.

28 Xanthan Gum for High-salt Systems
You've probably heard that salsa now outsells ketchup. Products like salsa may benefit from the addition of Kelco's new "brine tolerant" xanthan gum.

28 Oil Flavors Improve Reduced-fat Foods
New oil flavors give the taste of fat to lowfat foods. One to two ounces of the flavors replace 100 pounds of oil.

PROCESSING & CONTROL

48 Aseptic System Processes Liquids, Solids
Alfa-Laval has an answer to the problem of how to aseptically process low-acid particulates and sterilize the particulate without over-processing the liquid.

50 Brix Controlled On-line by SPC

Critical-angle refractometers continuously monitor sugar concentrations in sliced peaches and signal controllers to adjust sugar to specified levels.

FOOD PACKAGING

68 Rotary System Improves Packaging

Lunch Bucket shelf-stable microwaveable entrees feature a plastic overcap designed with an inner lip seal for tight fit to avoid product leakage during heating.

70 Silica Coated Films Arouse Interest

Pack Alimentaire was the site of a standing-room only session on the intriguing topic of glass-coated films.

FEATURES

84 Global New Plant Design

A number of new food plants began operations this year. *Food Engineering* takes a look at the best of these and reveals its selection for New Plant of the Year.

107 The 1992 International Dairy Show

A heady mix of 50 seminars, record numbers of exhibits, and solid entertainment at the New Orleans Convention Center should give the dairy industry its best show ever.

115 Site Selection: Surveying the Possibilities

Two decades ago, food companies would do their own site studies, but now it takes full-time experts to navigate through the ins and outs of site selection.

121 Making Sensory Panels Work

Like other expensive instruments, descriptive panels require a fair amount of TLC. But they provide a wealth of information for R&D and QA.

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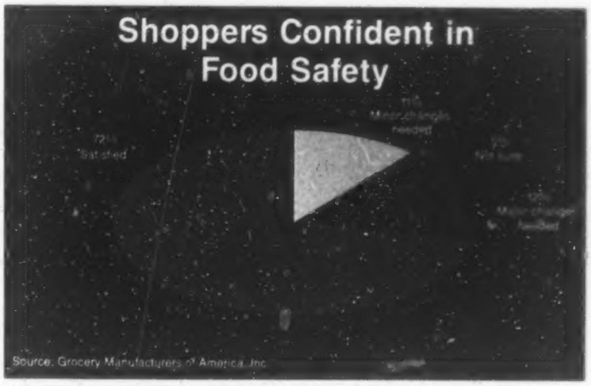
INDUSTRY REPORT

70% voice satisfaction with food safety ...

Some 70 percent of the consumers polled by the Grocery Manufacturers of America, Inc. (GMA) expressed confidence in the safety of packaged food and 72 percent are happy with what is currently being done to ensure the safety of packaged food. Only 12 percent said major changes were in order, while 11 percent said minor changes would work. Approximately, the same numbers of respondents feel the national government, rather than the states, should be responsible for ensuring that the food supply is safe.

The research was conducted via telephone interviews with a national cross section of just over 1,000 consumers. Seventy-one percent read labels when they consider buying a packaged food product for the first time, primarily to find out about fat or cholesterol, vitamins and minerals, salt and calories. An important finding is that ***63 percent of the shoppers say the current nutrition label tells them what they want to know.*** *Twenty-eight percent said the label fails to provide enough info. Shoppers said accurate and informative labeling should be among the industry's top priorities in the future.* *(Continued on page 18.)*



Source: Grocery Manufacturers of America, Inc.

An impressive 72 percent expressed confidence in the safety of packaged foods.

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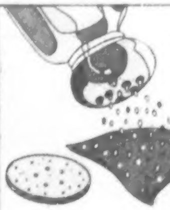

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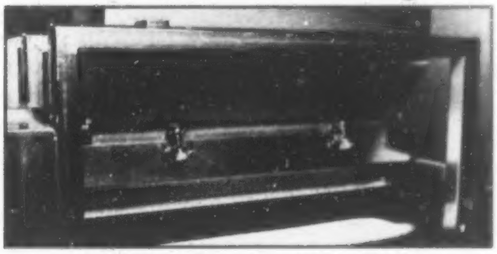
You Can Do It Right!



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... few shoppers go for environmental effects of packaging

Factor	Important	Least Important
Nutrition	44%	3%
Taste	17	5
Ease of preparation	5	43
Environmentally responsible packaging	3	26
Price	19	26
Product safety	9	11

Source: Grocery Manufacturers of America, Inc.

Interestingly enough, as record numbers of consumers embrace recycling, very few pay much attention to environmental claims made on packaging prior to purchasing, according to the GMA study. Only three percent of those surveyed said environmental packaging was the most important consideration when deciding upon a purchase, another 11 percent said it was their second most important consideration. Meanwhile, 26 percent said it was the least important factor. While environmental packaging is not a deciding factor in a buying decision, record numbers of consumers are recycling. Three out of five shoppers say they routinely separate their trash before taking it out for collection.

A startling finding was that ***43 percent of the respondents said ease of preparation was least important*** *to them. Perhaps this is because shoppers buy convenience foods and ingredients that they already know can be prepared within a reasonable time frame and so they don't consciously think about preparation time while making a buying decision.*

Americans are buying Irradiated Foods.

The opening of the first American facility dedicated to food irradiation marked a breakthrough in the food industry. Bringing irradiated produce into the marketplace marked another breakthrough — in record sales!

Shoppers in North Miami Beach purchased 1000 pints of irradiated strawberries over six days, and in Chicago, irradiated berries outsold the unirradiated fruit by nine to one. Consumer response at a Central Florida Strawberry Festival was even more remarkable. More than 12,000 pints of irradiated berries were sold during the 11-day event.

Quality was the key: produce treated with irradiation does not require post-harvest chemical fumigants, and stays fresh longer.

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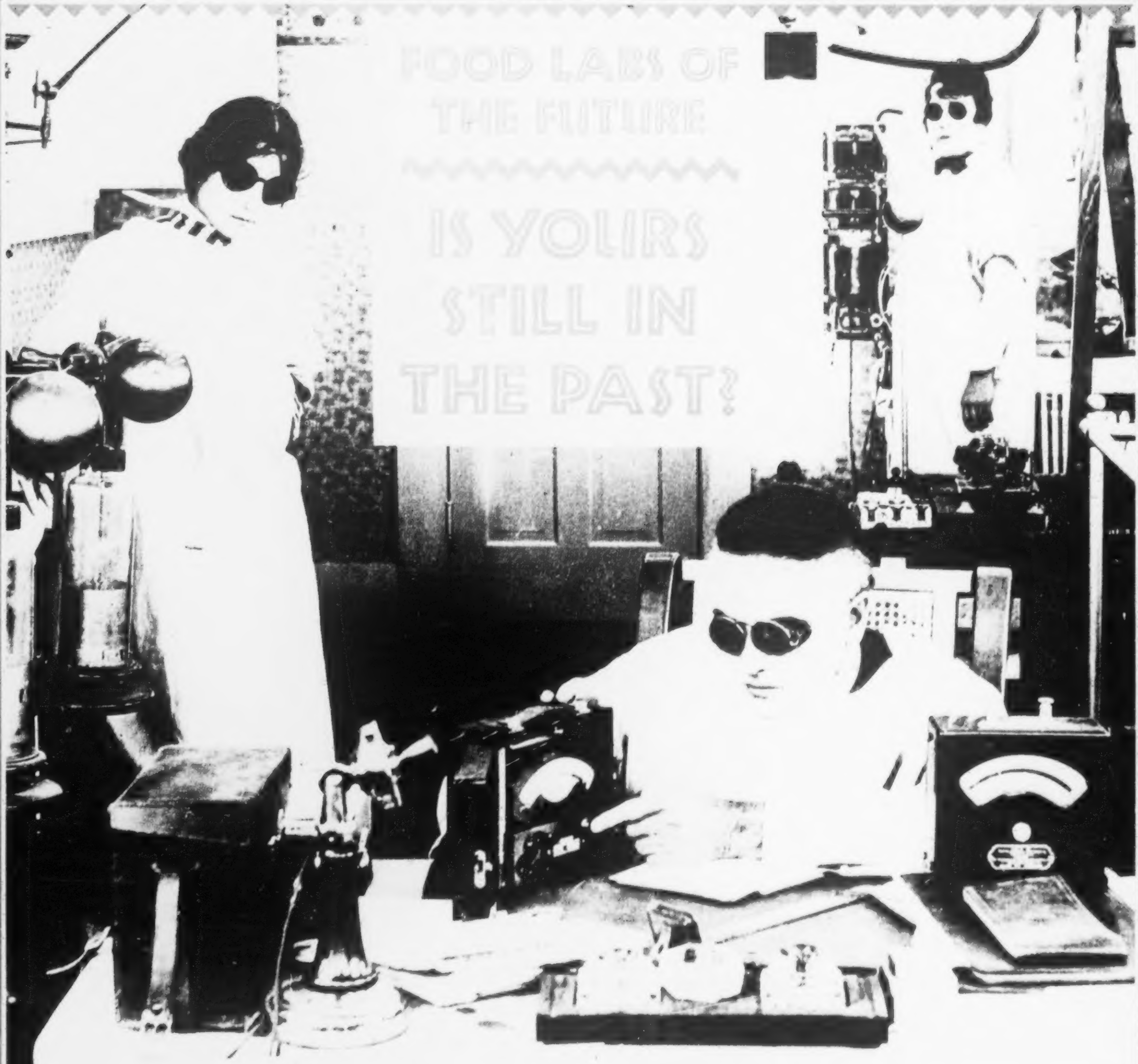

FOOD LABS OF THE FUTURE

IS YOURS STILL IN THE PAST?

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ABOUT THE COVER

Food labs just aren't what they used to be. Today's laboratory, embracing new technology, contract services and integrated management techniques, is a far cry from the lab of even several years ago.
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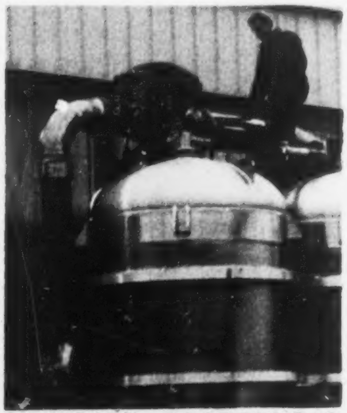

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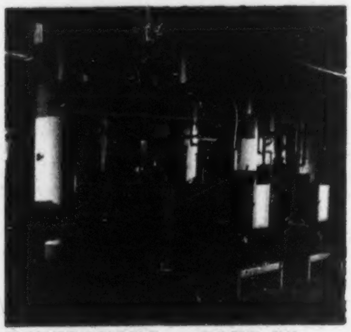

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New process enables rapid screening of the genera Salmonella and Listeria and Staphylococcal enterotoxin.

39 Bacterial Counts in Thirty Minutes

A technique used for water quality testing since the '70s is finding increased use in the food industry.

42 Saying 'I do' to Partnerships

F*ood Engineering*'s roundtable discussion focuses on food company/supplier partnerships.

48 Choices – Healthy Disclosures

Recent events suggest the need for more candor with the press from both industry and the scientific community.

PROCESSING & CONTROL

72 Natural Lactic Acid Plant Opens Doors

Ecological Chemical Products Co. (Ecochem), a 50/50 joint venture between DuPont and ConAgra, started up a $20-million lactic acid plant mid-August.

76 Stork Integrates Shelf-stable Systems

Stork Food Machinery has developed an "integrated shelf stability" program for single-source supply and responsibility of food sterilization systems.

85 Size of Pilot Dryer Critical in Simulation

What works for the 100 lb. per hour pilot dryer doesn't guarantee success during large-scale production.

86 Online – Simulation

Whether scaling up, upgrading an existing facility, or setting controllers, consider the use of simulation.

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104 Blowmolded Plastic Replaces Glass Jugs
Ocean Spray Cranberries, Inc., looking for a replacement for its one-gallon glass juice jugs, will choose plastic.

106 Combination Package Helps Environment
German packaging system combines a paperboard folding carton and coextruded plastic film.

110 Trendwatch—Packaging Waste
Germany's dual-system for recycling—a model for the future or a blueprint for chaos?

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Food companies are turning to contract services and embracing integrated management techniques to keep the laboratory structure lean and mean.

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Improved barrier materials and machinery advances lead the way in packaging purchases for the coming year.

147 Pumps for All Seasons
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153 PACK EXPO '92 Gets Green
Top packaging show offers ways to cope with consumer demand for environmentally-friendly packaging.

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New pet food plant by Hill's Division of Colgate-Palmolive features "socio-tech" work environment, human-food standards and flexible manufacturing.

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PACKAGING BUYERS SURVEY

Improved barrier materials and machinery advances lead the way in packaging purchases for the coming year.

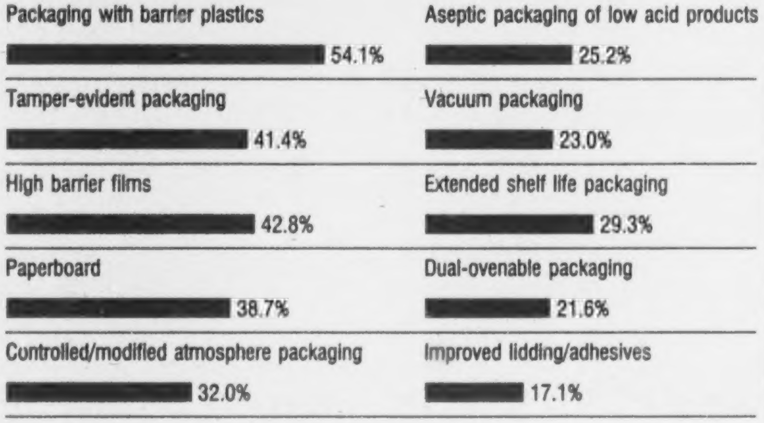
MARGIE J. RUSSELL
TECHNICAL EDITOR

The results are in on *Food Engineering's* seventh annual Packaging Buyers Survey and the members of the Executive Advisory Panel continue to seek better plastic packaging materials for their products, to the probable chagrin of watchful environmentalists. The more than 500 members of the panel told us that packaging with barrier plastics ranks at the top of the technologies that are likely to be the most important to them over the next two years. Coming in a strong second was packaging with high barrier films, as some 48 percent of our respondents indicated that this category would be an important area in their firms for the next two years. Some had special requests from suppliers including:

- "A low cost, high barrier, clear plastic rigid container that is easily recyclable." – director, technical services for a spice company.
- "We need reusable containers with the barrier and inert properties of glass." – senior vice president of operations for a beverage manufacturer.
- "A plastic jar suitable for pickles that is heat resistant with vacuum capability. The container must have good market appearance." – director of packaging systems for a Midwest food processor.
- "A clear flexible film that has the

Important Packaging Areas

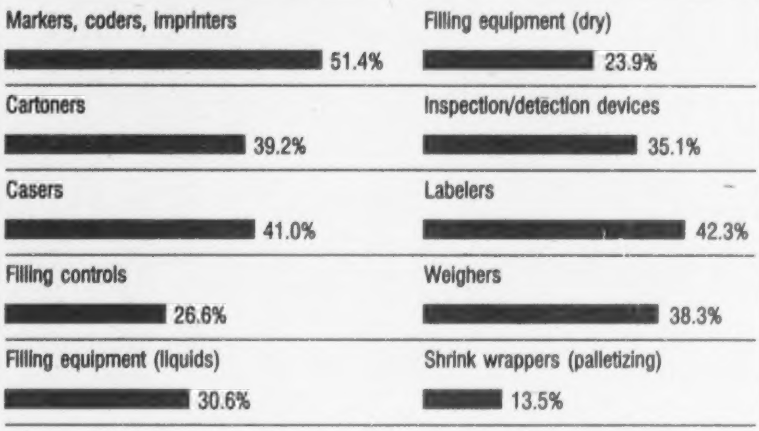
Respondents were asked to check the areas of food packaging likely to be of most importance to their firms over the next two years.



Source: Food Engineering's Packaging Survey 1992.

Machinery Purchases

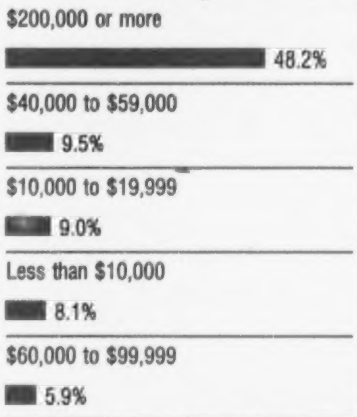
Respondents were asked to check the types of packaging machinery their operation purchased in the past twelve months.



Source: Food Engineering's Packaging Survey 1992.

Spending Trends

Respondents were asked to indicate expenditures on equipment in 1992.



Source: Food Engineering's Packaging Survey 1992.

barrier properties of metallized film."—director of packaging for a Northeast processor.

One member, though, went all out when he wished for a "flexible, clear film with oxygen and moisture barrier properties capable of maintaining the oxygen and moisture level in the food and package for five years." Yet, as good a wish as it is, such a wish usually has a major drawback: acceptable disposal. Now that legislation is aimed at the disposal of various packaging forms, packagers constantly wrestle with two opposing forces: efficient, convenient packaging for the consumer and easy, effective disposability of the packaging material after it has done its primary job. One member (a senior project engineer of packaging for a Northeast specialty food company) indicated that his company was "changing to more recyclable materials or those perceived by the customer as environmentally-friendly." And the manager of packaging research for a Midwest firm stated that "we are changing to environmental marketing in order to remain competitive."

Despite the rough economic times, members of the panel (63 percent) told us they are planning on making significant changes in packaging line machinery in their operations during the next year. Approximately 48 percent of these respondents expect to spend $200,000 or more on packaging equipment this year, with 9.5 percent spending between $40,000 to $59,000.

Many respondents are looking to replace old equipment and update lines. "I need to replace existing equipment which is not adaptable to a new package and a new product" said the senior vice president of a beverage company. A director of technical services for a specialty food processor is planning on "replacing a filler with newer, higher speed equipment which will enable the use of lower-cost cartons and shippers." A director of research and development for a pet food firm is also looking to replace some equipment with high speed models, but is also "looking at some equipment which can fill a greater amount of sizes."

In addition to the replacement of equipment, many panel members are eagerly seeking the upgrades that new technology provides, particularly automation. One member (a manager of packaging engineering and maintenance for a confectionery company) stated that "it is time to automate various labor intensive functions." A vice president of a chocolate company indicated that his firm is looking to replace people with more automatic equipment. Automation, weight control, and simplified changeovers were high on the list of one corporate industrial engineer.

And, for the second year in a row, our panelists overwhelmingly affirmed (84 percent) that they are willing to pay for automation on a new piece of equipment. Many respondents explained that automation was needed to insure uniform weights, rework reduction, and quality control. A vice president of manufacturing for a dairy firm pointed to reliability, variable cost/reduction in labor, and information feedback as his reasons for having automation on his equipment. "Our packaging lines are simple," says a plant manager for a Northeast poultry company, "and our volumes are low. Automation is a realistic cost for small processors and the development of 'pocket' systems would be to our benefit." And two respondents summed up their needs very directly and succinctly: "cost, cost, cost" and "quality, quality, quality."

However, a mere nine percent responded that they would not pay the extra price for such technology, with the president of a firm citing "automation tends to lead to less quality control in products." One CEO indicated that his company uses very low-cost labor and the package is only a part-time cost of the entire operation. "We've over-automated too far," explained a technical services engineer for a West coast firm. "Operators lose touch with the reality of packaging problems and defects."

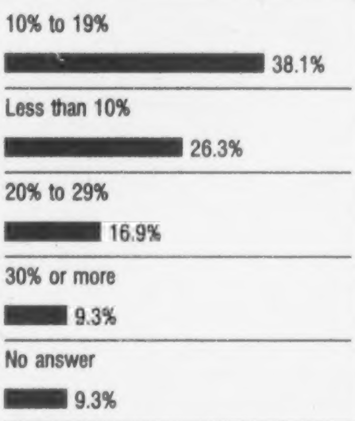
Comparison and contrast

In our survey, panelists were asked to describe the relationship between packaging materials/corresponding machinery capabilities and packaging design/development. The question revealed several interesting viewpoints, with almost 43 percent responding that materials and machinery are consistent with packaging design and development. "Good planning and communication between packaging research, packaging design, product development and marketing is the key," responded a senior director of product development for a candy company. Many panelists responded with a simple: "they must go hand in hand."

Coming in a close second, 38 percent of the survey's respondents indicated that materials/machinery lag behind packaging development and design. "Equipment manufacturers need to communicate with the end user and material suppliers to keep up on packaging changes and developments," said a manager of quality assurance for a Midwest processor. Another respondent indicated that "the market changes too fast for machine manufacturing to keep up" (plant engineer with a supermarket chain). And a research specialist with a Midwest company claimed that the lag was due to "poor engineering! The

Percentage of Development Cost

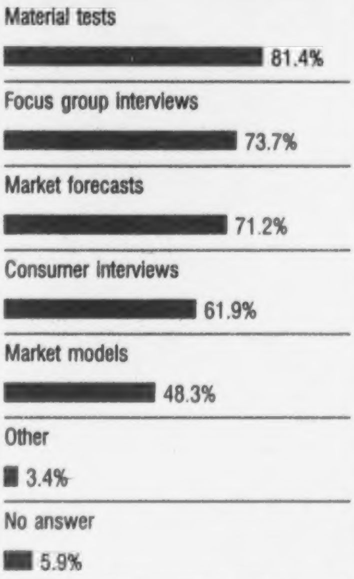
Respondents were asked to indicate what percentage of product development cost is represented by packaging.



Source: Food Engineering's Packaging Survey 1992.

Packaging Design Process

Respondents were asked to check the steps their firms include in a new package design process. (Company does own design.)



Source: Food Engineering's Packaging Survey 1992.

PACKAGING BUYERS SURVEY

Respondents to this year's survey were asked to select, from a group of six factors, the top three which exert the most influence on the final choice of a packaging material. The six factors: consumer preferences, cost, design feasibility, environmental issues, historical reasons, and market test results.

Cost factors won handily, with 87 percent of the respondents indicating that cost is still one of the most important, if not the most important factor in selecting a packaging material. Consumer preferences came in with a solid second place finish at 75 percent. Approximately 38 percent indicated that design feasibility was most important to them, followed by environmental issues (37 percent), market test results (33 percent), and historical reasons with 21 percent.

What does all this mean? If these answers are any indication, then the industry is still very cost conscious, since it is very difficult to adequately create a package that meets consumer demands and preferences, is relatively easy to design, is environmentally sound, and above all, does not cost the supplier and customer an outrageous sum to manufacture. These results probably point out, too, that overpackaging exists very little, since it costs all parties great sums of money and is simply a waste of everything, from raw materials to production time.

We also asked the panel: "If you had to pick one material that looks endangered, what would it be?" By a slim margin, 34 percent chose metal (other than aluminum) as an endangered material. Glass followed with 23 percent, plastic with almost 20 percent, and paperboard with almost eight percent. These results are not meant to indicate, however, that any of the listed materials are *actually* endangered. It simply shows that the choice of a material depends on many factors, and no one material is perfect for every application. Many respondents, for example, may simply prefer plastic over glass, or paperboard over plastic, and predict that a material that appears less popular to them may be endangered in a few years.

package is not complex, but the machinery can't run efficiently with acceptable maintenance costs."

Yet, 13.5 percent of our respondents told us they think materials and machinery are ahead of package development. "Design engineering for mechanical applications is generally straightforward," stated a plant manager for a poultry processor, "and appropriate packaging providing benefit to the processor and the consumer is not." One panel member attributed the leading status for materials and machinery as a "lack of creative thinkers." And, another panelist (vice president of manufacturing for a baking company in the South), simply indicated that "package design in our industry is dictated by machinery."

Future trends

In this year's survey, our panel members were asked to list major trends they see emerging in food packaging over the next two years. The overwhelming trend stated by a large number of the respondents was environmentally-friendly packaging. Many respondents indicated that there will be more recyclable packaging and more source reduction (reduced overpackaging) in order to meet continuing environmental challenges. Many panelists stated that improved microwave capabilities are important, as are improved barrier properties with fewer layers and better graphics capabilities. Extremes in packaging sizes—jumbo, family, and single versus two servings—will emerge as important trends as well.

Our panelists also receive the opportunity in the survey to describe a material or packaging system they need, but have been unable to find. Some examples:

- A sales and marketing vice president wants "a biodegradable film that will bleach out the name in the sun, dissolve from the outside in, and still last six months."
- A director of quality control/R&D is looking for "a film or bag that has antiseptic or microbial prevention capabilities. This could be beneficial as a final step in the packaging of fresh items."

FE's Packaging Buyers Survey costs $150 and is available by contacting Anne Hartnett at 215-964-4444; fax: 215-964-2915. ▲